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AUTHOR McClure, Charles R.; Hernon, Peter
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ABSTRACT

A discussion piece to assist the U.S. Bureau of the Census in planning for the effective use and dissemination of future census data and products in the Government Printing Office's Depository Library Program (DLP), this report identifies key issues that may affect the role of the DLP in providing the public with access to Census Bureau data. The report discusses likely trends that will affect the effectiveness with which the DLP provides access to Census Bureau services, and describes a range of possible scenarios for the dissemination of Census Bureau data and services that will influence the DLP. A concise descriptive listing of key issues and policy questions that require debate and discussion in the professional community is provided. The report focuses on eight issue areas: (1) future technologies for exploiting Census Bureau data; (2) the rate of absorption of new technologies by depository libraries; (3) space considerations for storing Census documents over time; (4) use of paper as a preferred medium for the data; (5) use of other media as storage devices; (6) how the structure of the DLP may affect the dissemination of Census data; (7) trends in the usage of Census data; and (8) the feasibility of more research in the patterns of use of the data. Appended materials include a questionnaire used at a meeting of the Depository Library Council to the Public Printer and a paper, "Future Information Technology and Dissemination Trends: A Literature Search and Analysis" (Nancy R. Preston). (6 figures; 88 references) (SD)

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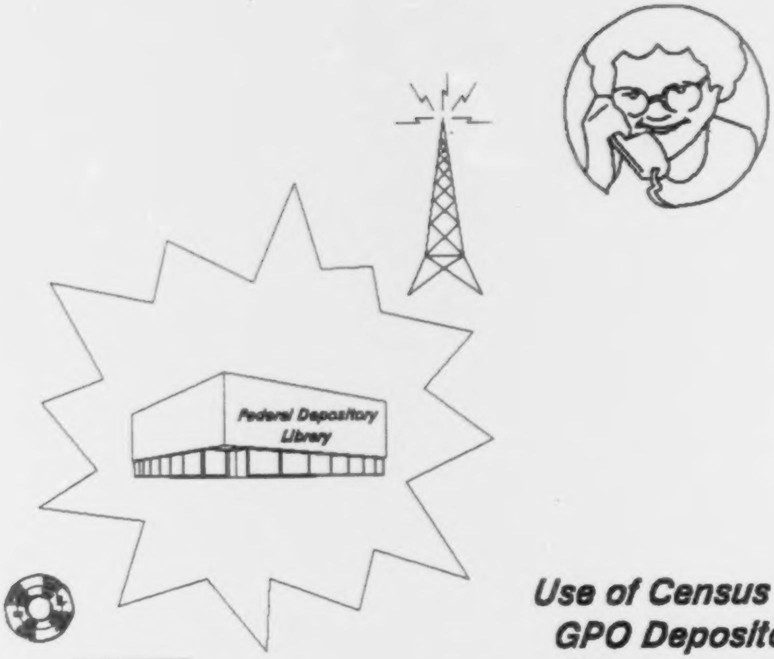
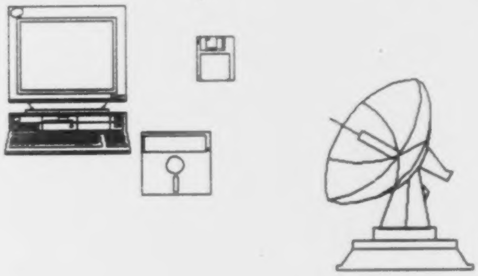
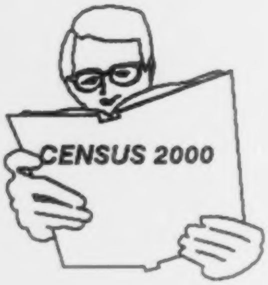


Use of Census Bureau Data in GPO Depository Libraries: Future Issues and Trends





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USE OF CENSUS BUREAU DATA
IN GPO DEPOSITORY LIBRARIES:
FUTURE ISSUES AND TRENDS

Final Report

for

United States Bureau of the Census
21st Century Decennial Census Planning Staff

By

Charles R. McClure and Peter Hernon

Information Management Consultant Services, Inc.

7508 Northfield Lane

Manlius, New York 13104

June 1990

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The following librarians participated in the focus group interviews conducted at the Depository Library Council to the Public Printer, April 1990: Jack Sulzer, Pennsylvania State University; Peggy Prudden, Montgomery Co. Public Library; Patrick Ragains, Montana State University; Mary Redmond, New York State Library; Diane Garner, Pennsylvania State University; Tom Rohrig, Texas Tech University; Roz Jacob, St. Paul Public Library; Maggie Parchamovich, Arizona State University; Duncan M. Aldrich, University of Nevada, Reno; Karlo K. Mustonen, Utah State University; and Raeann Dossett, University of Illinois.

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Chapter One

Introduction

The primary goal of this study is to produce a discussion piece that will assist the United States Bureau of the Census in planning for the effective use and dissemination of future census data and products in libraries participating in the depository program administered by the Government Printing Office (GPO).

The depository library program was created in the nineteenth century. In 1859, it included twelve libraries. Now the program contains 1,399 libraries spread throughout the United States and its territories. The program consists of: (1) 54 regionals that receive and retain all that the GPO makes available for depository distribution and (2) 1,345 selectives that pre-select those items they will receive and retain. This depository library program is only one such depository program involving cooperation between the Federal government and the library community. However, this program is the largest and best known. The investigation reported in this study focuses on GPO's depository program.

The study has the following objectives:

- Identify key issues that may impact on the role of the depository library program in providing the public with access to Census Bureau data;
- Determine likely trends that will affect the effectiveness by which the depository library program provides access to Census Bureau services and products;
- Describe a range of possible Census Bureau data and services dissemination scenarios that will impact on the depository library program; and
- Provide a concise, descriptive listing of key issues and policy questions relating to the role of the depository library program as a safety net for Census Bureau data that require debate and discussion in the professional community.

Ultimately, the study should increase the awareness of various stakeholders concerning options and possible strategies for the dissemination of Census Bureau data. Furthermore, the study is intended to serve as a catalyst by focusing attention on key issues and sharpen national discussion about how best to plan future services and resolve key issues.

AREAS OF FOCUS

The Bureau of the Census charged the authors to examine eight issue areas. The following areas, therefore, form the basis for the study:

1. Future technology for exploiting Census Bureau data, such as CD-ROM, fiber optics, bubble memories for increased storage, on-line links to Federal information databases, and other technological advances that may affect data access, storage, retrieval, and use by library users.

2. Rate of absorption of new technologies by the Federal depository libraries with a focus on the relationship between the type of library (regional, academic, law, public) and their ability to acquire and use the new technologies.

3. Space limitation and its relationship to the ability of regional and other Federal depository libraries to display and store Census Bureau documents over time.

4. Use of paper documents as a preferred medium for Census Bureau data. Current information indicates that the Federal depository libraries are the single largest user of Census Bureau decennial census [printed] documents; they acquired over 25% of the total documents printed from the 1980 census. If the preference for paper as a medium for data dissemination continues in the future, it will have an important effect on the media mix of census data dissemination.

5. Use of other media, both new (CD-ROM) and old (microform) as storage devices and the possibility of such storage media replacing paper for historical data and for current retrieval.

6. Structure of the Federal depository library program and how that structure may affect dissemination of Census Bureau data to depository libraries.

7. Trends in usage of Census Bureau data; will Federal depository libraries' usage increase, decrease, or remain the same.

8. Feasibility of more research in the user/use patterns of Census Bureau data in the Federal depository libraries, with emphasis on the possibilities for studying the users and use of information from the 1990 census.

STUDY FRAMEWORK

Five key topical areas provided the context for the literature review and data collection. These areas are as follows:

- Evolving environmental context: In an environmental scan for the near term (5-10 years) what general trends and opportunities exist? What are the likely social, economic, demographic, political, and other types of factors that will provide a context in which users of Census Bureau data consult the depository program?

- Information technology trends: What are the key and evolving information technologies? How will various information technologies converge or evolve in the future? To what degree will such developing technologies penetrate the documents collections and services of libraries participating in the depository program? What information technologies and delivery systems accessible to the depository library program will best meet the information needs of Census Bureau data users?

- User needs and information-gathering skills: What are (and will be) the information needs of users of Census Bureau data that the depository library program will meet? How sophisticated will these users be of evolving information technologies? What are their expectations of the depository program in this regard?

- Depository program trends and constraints: Will the current structure of the depository program change before the end of the century? What options should be considered in restructuring the depository program? Which structure maximizes accessibility to Census Bureau data?

- Census Bureau trends and constraints: Which Census Bureau data services and products have the greatest utility to users of the depository program? What data products and services, what technology applications, and what dissemination mechanisms are currently being planned for use by the Census Bureau that might appeal to depository librarians and depository library clientele?

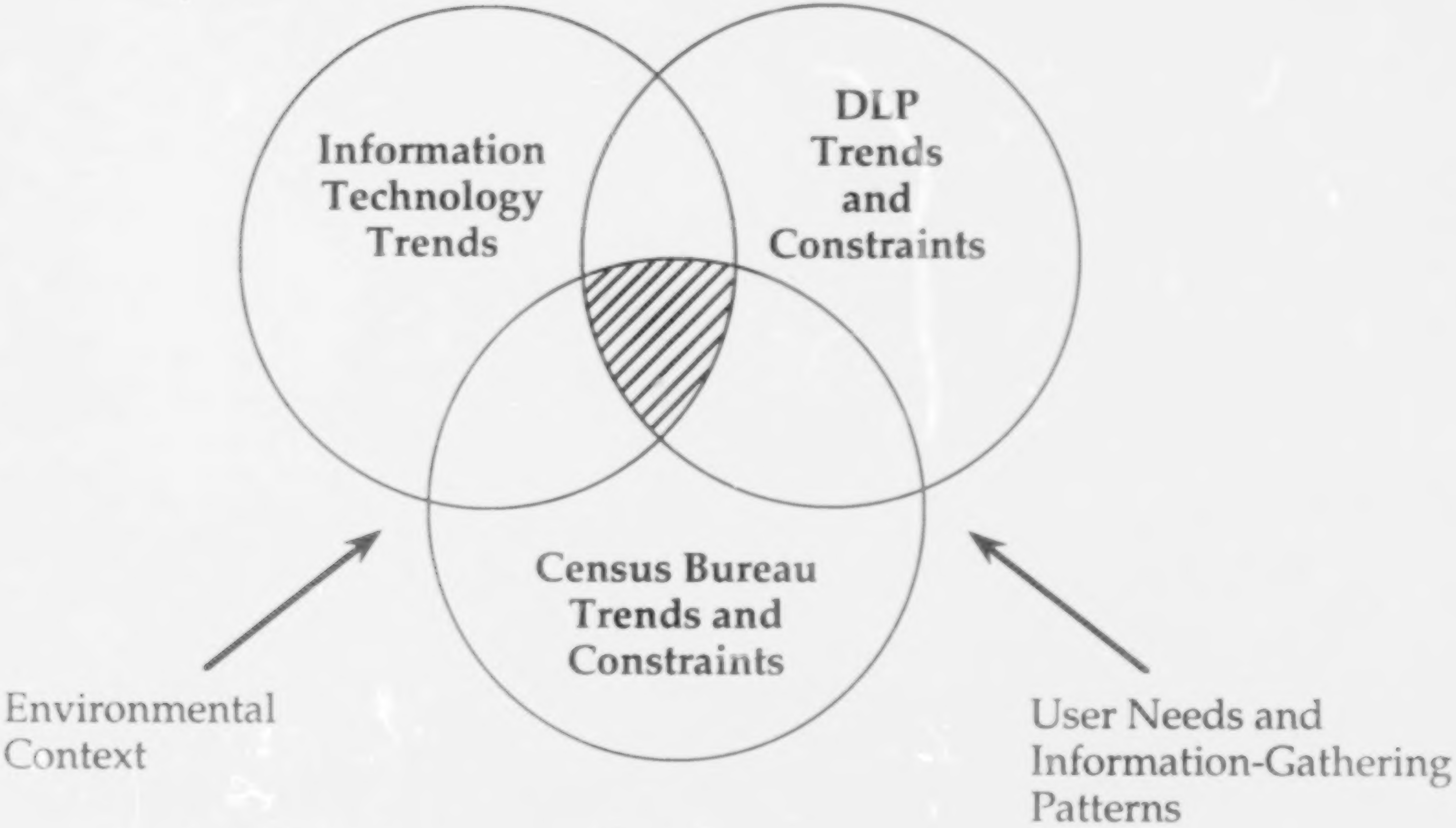
Figure 1-1 graphically depicts the interrelationship among the five topical areas. The shaded portion of the venn diagram represents the focus of this study and reflects the eight issue areas specified by the Bureau.

Figure 1-2 builds upon the previous figure and presents the framework within which the authors completed the project. The literature review and data collection provide relevant information on the five topical areas. This approach ensures that the study considers the "big picture" and identifies key issues meriting national discussion.

Appendix A of the report discusses the data collection techniques used. The report represents a synthesis of the views and perspectives of numerous librarians and others, as well as draws upon an extensive and broad literature review.

Figure 1-1

Conceptualization of Study



Information Technology Trends

DLP Trends and Constraints

Census Bureau Trends and Constraints

Environmental Context

User Needs and Information-Gathering Patterns

ENVIRONMENTAL CONTEXT

This section, which is based on a paper prepared by Donald L. Day (1990) of Syracuse University's School of Information Studies, provides a brief overview of future trends.

Overview

Centron (1988) and others predict an enlarged middle class, cultural homogenization, and an increasing number of citizens over the age of 65. Information consumption may be influenced significantly by an increase in middle-class affluence. More sophisticated, better-educated consumers with work experience will have disposable income for travel, leisure, and luxury. Spending will continue to shift toward service industries (Ibid.).

By 2000, manufacturing will employ only nine percent of the labor force, with services taking 88 percent, partly because productivity in automated industries may increase fivefold. Seventy percent of U.S. homes may have computers, facilitating the potential for widespread remote access to information (Ibid.).

Changes in the work force may be a key influence during the next decade. The mandatory retirement age may be 70, and union members may comprise less than 10 percent of the labor force (versus 29 percent in 1975 and 18 percent in 1985). People will change careers an average of every decade. A shortage of low-wage workers will further encourage businesses to automate and to seek foreign work force. The ranks of the self-employed will grow at a faster rate than salaried workers, and more mid-career professionals will become entrepreneurs (Ibid.).

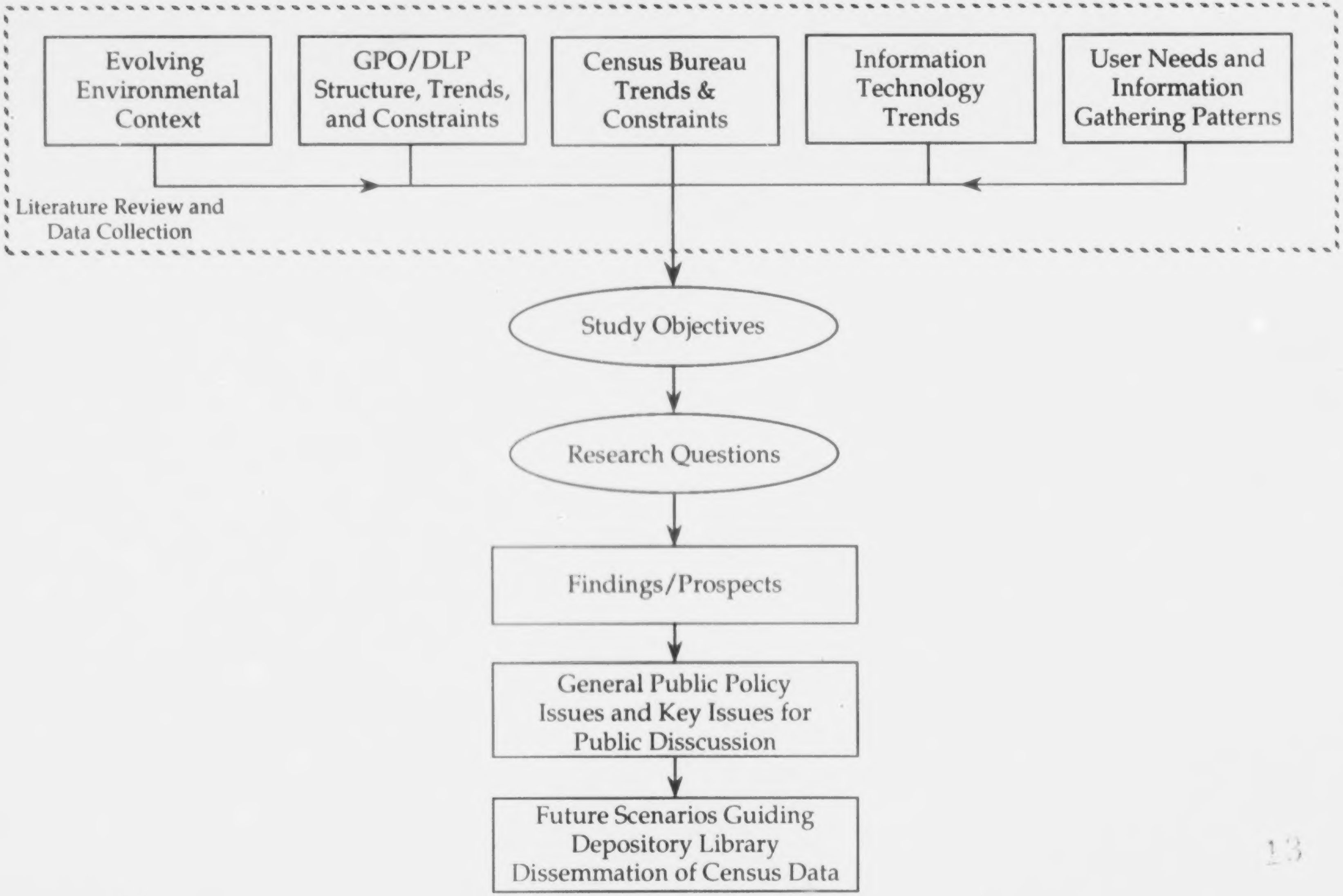
Also anticipated are a decrease in the divorce rate, an increase in marriages and family formation, and a heightened role for religion. Do-it-yourself activities will be popular, because a 32-hour work week will create more leisure time and because the cost of services will continue to increase. Protracted adolescence may be more common, although there will be far fewer young people than at present.

Postindustrial Society

The United States is becoming a postindustrial society. Telecommunications and computers are vital to the transfer of information, data, and knowledge (Bell, 1978). New information and processing devices increase productivity, despite initial retraining losses. Knowledge industries grow in importance.

Figure 1-2

Overview of Study Framework


Evolving Environmental Context
GPO/DLP Structure, Trends, and Constraints
Census Bureau Trends & Constraints
Information Technology Trends
User Needs and Information Gathering Patterns
Literature Review and Data Collection
Study Objectives
Research Questions
Findings/Prospects
General Public Policy Issues and Key Issues for Public Disscussion
Future Scenarios Guiding Depository Library Dissemmation of Census Data

The United States as a postindustrial society is likely to have a vastly different social structure than at present (Bell, 1978) believes that this new order may be characterized by:

- Centrality of theoretical knowledge as the basis of innovation;
- Creation of new intellectual techniques to engineer solutions to economic and social problems;
- The spread of a technical and professional knowledge class;
- The change from goods to human services;
- A change in the character of work (people must learn to live with one another, since interaction among groups will be the key);
- The employment of women in expanded human services;
- Science as the societal standard bearer;
- Political units comprised of either vertical organizations of individuals into scientific, technical, administrative, and cultural centers; or of institutions arrayed as economic, government, university, or social complexes;
- Meritocracy (an emphasis on education and skill); and
- The economics of information.

Eldredge (1978) takes a more pessimistic view of the impact of advanced telecommunications technology. He believes that new technology will:

- Be highly beneficial to some segments of society, but detrimental to others;
- Have a positive impact primarily in the middle-class suburbs, with a negative impact in central cities;
- Not be properly understood and regulated until considerable damage has been done in major urban development;
- Reduce the economic viability of the central city by accelerating delocalization of business and commerce; and
- Affect the service sector most, because its processes involve paper transactions that are particularly sensitive to technological substitution.

Against, this background the rest of the report investigates the shaded area depicted in Figure 1-1. It merits noting that the report focuses on the depository library program in relationship to census products and services. The report does not examine the depository program in other contexts.

Chapter Two

Assessment of Issue Areas

The 21st Century Planning Staff of the Bureau of the Census identified eight issue areas relating to the depository library program administered by the Government Printing Office (GPO) on which they want the study to focus. Having access to the information gathered from the study should assist the Bureau in planning for the effective use and dissemination of census data in depository libraries. The information, it is hoped, also provides the Bureau with a better understanding of the depository program and key issues/concerns affecting its effective operation.

ISSUE AREA ONE

> Future information-handling technologies, with potential for exploiting Census Bureau data, such as CD-ROM, fiber optics, bubble memories for increased storage, on-line links to Federal information databases, and other technological advances that may affect data access, storage, retrieval, and use by library users.

It is hard to provide a definitive answer to this issue area. Right now, attention, both within the library community and the Bureau of the Census, focuses on the completion of the 1990 decennial census and the release of the related products. At this time, the Topologically Integrated Geographic Encoding and Referencing files (the TIGER system) perhaps represents the newest use of technology, and perhaps nobody fully understands its potential. The digital storage of map information has significant potential for linking a broad range of census and geographic data.

By the next century, PC-based technology might capture larger datasets than is possible today. Libraries are already contributing heavily to the development of information systems that deliver all kinds of information, and government information in electronic formats comprises one component. Libraries tap networks of statistical databanks and, by the end of the decade, will provide their users with access to more data than is possible now. Users can dial up files to which libraries subscribe but will have increased opportunities to gain direct access to datasets from sites outside the library.

The range of technological options seem endless, or at least hard to predict. Appendix E provides an overview of future information technologies, possible trends, and the impact of technology on libraries. The Appendix, thereby, offers a context for the discussion of this issue area.

CHARACTERISTICS OF THE TECHNOLOGY USED AND NEEDED

Most depository libraries prefer to use "mainstream," rather than "cutting edge," technology. The technology is the predominant one(s) of the time. Moreover, it has multiple uses. At this time, preferred technologies are PC-based. CD-ROM is an excellent example. It has become the preferred technology of the present and immediate future for libraries and their depository collections and services.

When librarians think of forthcoming census products available in electronic form, they tend to think in context of CD-ROM and the ability to manipulate and download data. Future technologies that will appeal broadly to depository librarians must have these qualities. End users not only consume government information and data, but they also create new uses of information and data and share datasets with others. The result is that the use of depository holdings increases, but secondary users may not be aware of the source of the information and data used.

If depository libraries are to adopt extensively new technologies, ones that have entered the "mainstream" of library applications, those technologies must possess five characteristics. They must

- Be reasonably priced (fit within the library budget and technology needs);
- Be end-user friendly;
- Not be too sophisticated, e.g., require extensive staff training and constant use to maintain search skills;
- Require minimal staff intervention; because the staff are very busy, end users must be able to function on their own with minimal staff assistance; and
- Be compatible with other library equipment.

Regardless of the technologies used, there must be a short learning curve and both staff and users must be able to learn for themselves. Concern about the amount of staff time involved was a theme underlying the librarians' response to a number of the issue areas. Many depository librarians lack the time for extensive training of users. Furthermore, libraries lack the resources, including time, to train all staff in the use of particular technologies. Use of multiple software programs compounds the problem and dBase III is not a "quick teach/learn" item. The Bureau or the private sector might develop a user friendly assistance program such as the National Library of Medicine did with its "Grateful Med."

In a recently published article, Zink (1990, p. 54) summarizes a number of problems that appeared during the focus group interviews. According to him,

> A persistent administrative malady is the assumption that technology will decrease, or at least not require additional, demands on staff time. While technological advances may have resulted in personnel reductions in selected technical service areas, the use of automation where the public directly confronts technology has generally increased the need for user assistance.
>
> Staff members will be asked to learn the new CD-ROM products, read training manuals, provide formal and one-on-one instruction, assist with search strategies, provide bibliographic instruction, change paper and ribbons, and maybe even assist with downloading of citations to floppy disks. This will require some knowledge of microcomputer use, even though the staff may not have been afforded the opportunity to use microcomputers extensively in their other duties.

Harris (1990) reinforces the point, but in relationship to documents librarianship: "Reference desk personnel and their hundreds of patrons must be educated in data product content, statistical methodology, and computer literacy."

Technologies that do not meet the characteristics discussed here are perhaps better left to providers other than depository libraries. (Nonetheless, libraries can serve as information mediators and direct clientele to pertinent information providers.) Businesses and consulting firms may rely on (and pay for) remote access to the holdings of other providers, but they might also use the holdings of depository libraries.

The dilemma presented to the depository program is that the gulf between the largest and smallest libraries may widen. Because smaller ones have fewer staff members and smaller budgets, they may fall farther behind in the use and acquisition of technology. This discrepancy may have implications for the depository library program and its formal structure.

NETWORKING CAPABILITIES

Networking can be viewed in two contexts: (1) internal and (2) external to the organization. Internal networking focuses on the creation of local area networks (LANs) and the sharing of data and information throughout the organization. Libraries might have to expand the number of workstations to accommodate more users of one service at one time.

Libraries are developing systems (and will continue to do so) that let users access information from remote sites, assuming that their computers interface with the library computer through a modem. For remote access to function well, the system must be end-user friendly and require minimal staff intervention.

Multiple access to CD-ROM products produced by the public and private sector depends on the development of jukebox technology, which mechanically allows users to select the disc to be searched. SilverPlatter permits end-user selection of different databases. Libraries find that the number of database options now is limited. In the future, technological advances may permit multiple workstations on a LAN for accessing census data and other resources.

At the same time, libraries will need ample access to printers and software that interface with the CD-ROM products. Access to printers is vital for those working with datasets. Greater incorporation of electronic technologies into library collections, services, and operations may necessitate that many depository libraries consider the adoption of a fee-for-service policy to offset costs. However, a policy might conflict with a public library's general systems and service policy.

External networking involves the sharing of resources and, where there are telecommunications links, the prompt delivery and downloading of data and information. Right now, the delivery and downloading of data and information are a future issue and trend, except for a limited number of libraries.

In summary, two fundamental issues require attention. First, libraries need to accommodate more users of electronic services at one time. And, second, these users need more choices as to the format and content of databases and datasets at their immediate command.

Following a discussion of each of the eight issue areas, we conclude with a list of summary issues. Chapter 3 provides a general policy overview, again with another list of summary issues. Chapter 4 reduces the various summary issues presented in Chapters 2 and 3 to broader categories. Chapters 4 and 5 might guide future discussion and encourage the development of a partnership for the future between the Bureau and the depository library program.

SUMMARY ISSUES

- Libraries prefer to adopt "mainstream," not "cutting edge" technology and to rely on a few types of technology, in particular, CD-ROM, microfiche, and e-mail. To what extent will the Bureau of the Census accommodate these preferences as well as networking?
- To what extent can the Bureau of the Census develop and extend access to data through electronic bulletin boards or networks?

- To what extent can census data available in electronic form be downloaded and manipulated? Will such capacity increase in the future?

- Librarians cannot provide access to all census data. Which data sets do they prefer to house and service on-site and remotely?

- Will the gulf between the largest and smallest depository libraries widen? How does this impact networking and access to census data?

- Which depositories will have telecommunication linkage? How can all depositories take advantage of such links?

- Will depository library users have to pay for access to electronic data? How will user fees be set up and administered?

- To what extent will cost-sharing affect depository library access to census data?

- Staff and user training will become increasingly important. How will such training for census products and data be provided? How effective is such training?

- If depository libraries must charge users, and if costs for operating libraries continue to rise, will the "safety net" public access capability of libraries diminish?

ISSUE AREA TWO

Rate of absorption of new technologies by the Federal depository libraries with a focus on the relationship between the type of library (regional, academic, law, public) and their ability to acquire and use the new technologies.

The issue area does not offer an adequate representation of membership in the depository program. There are other types of depository libraries (see Hernon, McClure, and Purcell, 1985). Equally as important, regional depositories include academic, state agency, and public libraries. As a generalization, academic depositories absorb technology the quickest. The poorer, less well-supported libraries (frequently public) lag behind. Because of their specialized collections, law schools may also not have as much electronic equipment as other types of depositories. They are likely to have microcomputers and modems for on-line research but may be less likely to have CD-ROM capability.

Participants in many of the focus group interviews believed that the distinction was not among the types of libraries represented in the question. Rather, the difference was between large and small depositories, and whether or not the institution engages in high-level research. Size focuses on staff levels and the level and type of funding that a depository has. Funding is the critical variable, one that future research studies must address. (It merits mention that existing research on the depository library program has not isolated on size and attempted to correlate size with geographical location.)

The possession of a single CD-ROM workstation by a depository library does not necessarily mean that the library has fully embraced CD-ROM as a medium and is making effective use of it. The depository program encompasses the gamut ranging from tiny, rural libraries with total depository collection numbering less than 1,000 documents to huge, well-staffed, well-funded research collections in libraries equipped to handle information technologies.

This disparity among depository libraries will continue to exist, and perhaps widen as information technologies advance. There will always be depositories in the forefront of technological applications, and there will always be those lagging far behind (the notion of the "haves" and the "have nots"). One librarian, however, noted the same type of disparity exists among Federal information producing agencies as well.

RATE OF ABSORPTION

Libraries have absorbed microforms for years. Microfiche, one type of microform, is not as highly regarded today among depository librarians, as it has been in past years. The reasons are threefold:

- There is great variation in the legibility of the microfiche (due to the quality of the printed source document or tape product);
- The technology for high quality library readers and printers is not state-of-the-art; and
- Librarians are distrustful of microfiche as a means of disseminating publications through the depository program. The default of the GPO contractor and the inability of the GPO to curtail the microfiche backlog underscore depository librarian dissatisfaction with microfiche emanating from the public sector and its private sector contractors.

The consensus of the focus groups is that depositories are quickly absorbing microcomputers with CD-ROM drives. Supporting evidence is the fact that a 1988 survey of 403 responding Federal depository libraries reported that 283 of them have access to microcomputers without modems, 337 to microcomputers with modems, and 169 to CD-ROM reading equipment (Congress. Office of Technology Assessment, 1988, p. 133; see also General Accounting Office, 1988). At this time, the lack of standards and compatibility among CD-ROM vendors limits the rate of absorption of CD-ROM products.

Nonetheless, depository librarians participating in the focus group interviews emphasized the importance of CD-ROM and corresponding equipment, including printers. Printers have become more reasonably priced. Still, annual expenditures for ink cartridges and paper become sizable. Because demand outpaces the availability of a sufficient number of equipment in house, some depository librarians are forced to restrict the amount of time that users spend at a workstation. As demand increases and funds remain limited, more depository librarians may limit the provision of supplies on a gratis basis. Library clientele might have to supply their own paper, if they print more than a specified number of pages,or they might have to purchase paper.

The technology second in importance to the use of CD-ROM in depository services may well be FAX services. These services allow libraries to receive promptly information and some data not held in their collections. In part because FAX services provide access to printed data, librarians are expressing increased interest in electronic bulletin boards and electronic mail; e-mail is the process of sending text from one computer to another over a network. These two examples indicate a trend toward the acquisition of modems and the use of telecommunications links.

Clearly, libraries can download data sets for manipulation by their clientele. Conceivably, the ability to download data sets provides a means whereby libraries can obtain replacement copies of missing or mutilated datasets.

The 1989 Biennial Survey queried depository libraries about the number and type of hardware possessed by the entire library. Figure 2-1 summarizes the responses. Clearly, significant differences among the states and territories exist.

BARRIERS

A support issue is that of inadequate time and expertise among depository library staff for loading, maintaining, and effectively using databases in CD-ROM or other electronic formats. Such expertise may reside outside the documents department and is difficult to obtain. A library may have to wait weeks, for example, before being able to install disks or even to have malfunctioning hardware evaluated for repair.

Simple user aids are nonexistent and must be created by local staff or copied from other sources known to exist. While most users seem eager to use compact disks and are familiar with their advantages over printed sources, many lack the experience necessary to make optimal use of them and need a good deal of personal guidance, at least initially. Some seem ignorant of or reluctant to utilize downloading capabilities, and printer maintenance is a major problem for attendant staff. Hardware security is another access barrier in most libraries. Whereas printed sources remain on the shelves and available for use during all the hours the library is open, a library may lock its CD-ROM workstations up when staff leave for the night.

Another barrier to rapid absorption of new technologies in depository libraries is lack of support -- both in terms of software and staff time and expertise -- for effective application of these technologies. The wide variety of software packages available, their costs, and GPO's (or the issuing agency's) unwillingness or inability to provide adequate software and/or documentation so that information in electronic format may be easily utilized has delayed such utilization already and most certainly will continue to do so. Software packages for accessing currently available census products provide good examples of this type of problem. The Bureau has selected dBase III as the format for its most recent CD-ROM products, but has also developed simpler, public domain software that is available at nominal cost through a clearinghouse operated by the University of Tennessee or which may be downloaded directly from a Census Bureau computer.

One librarian offered a suggestion to help Federal depository libraries acquire equipment. He wants them to be given the option to purchase their hardware from either the GPO or the General Services Administration at Federal contract rates, plus

Figure 2-1. Hardware (Average Per Depository)*

State	FAX	On-line Services	Readers	Microfiche Reader/Printers	Duplicators
AK	0.67	1.78	5.22	3.00	0.44
AL	0.88	2.40	4.96	3.28	0.24
AR	0.56	1.78	4.61	1.89	0.11
AS	1.00	0.00	1.00	2.00	0.00
AZ	0.93	2.13	8.13	3.33	0.20
CA	0.49	2.95	6.95	2.81	0.20
CO	0.12	1.92	5.08	2.12	0.20
CT	0.50	1.91	4.14	2.64	0.09
DC	0.72	6.62	2.34	3.08	0.22
DE	0.40	2.20	6.60	3.20	0.40
FL	0.73	2.65	5.76	2.97	0.08
FM	1.00	0.00	3.00	0.00	0.00
GA	0.46	2.57	6.93	2.68	0.18
GU	0.00	0.00	3.50	2.50	0.00
HI	0.36	0.73	4.55	2.73	0.18
IA	0.29	2.33	3.90	1.67	0.05
ID	0.55	2.36	8.00	2.36	0.27
IL	0.72	2.14	4.79	2.68	0.14
IN	0.72	3.14	7.22	2.28	0.17
KS	0.71	2.18	4.94	2.41	0.24
KY	0.43	2.38	5.38	2.10	0.10
LA	0.27	2.46	6.54	2.31	0.31
MA	0.64	3.09	6.39	2.88	0.45
MD	0.79	12.83	8.08	3.08	0.38
ME	0.58	2.42	4.75	2.75	0.17
MI	0.85	3.33	4.90	2.42	0.23
MN	0.42	3.15	9.12	2.00	0.19
MO	0.78	2.28	5.78	2.31	0.25
MP	1.00	1.00	4.00	2.00	0.00
MS	0.75	20.17	4.58	2.50	0.17
MT	0.86	3.57	7.29	2.00	0.57
NC	0.79	1.76	5.42	2.61	0.18
ND	0.10	1.40	8.20	1.80	0.10
NE	0.50	1.57	6.07	1.50	0.21
NH	0.56	2.44	6.00	2.44	0.00
NJ	0.79	2.21	4.42	2.60	0.19
NM	1.00	3.36	7.36	2.27	0.18
NV	0.33	2.56	7.33	3.78	0.11
NY	0.53	7.19	8.55	3.53	0.42
OH	0.65	3.31	5.27	2.94	0.15
OK	0.70	2.75	12.10	3.20	0.40
OR	0.48	3.52	5.19	2.00	0.10
PA	0.75	2.54	64.24	2.21	0.16
PR	0.00	1.00	5.50	1.25	0.00
RI	0.25	1.67	4.00	3.33	0.08
RP	1.00	2.00	7.00	3.00	0.00

Figure 2-1 (Continued)

State	FAX	On-line Services	Readers	Microfiche Reader/Printers	Duplicators
SC	0.50	2.28	4.78	2.33	0.11
SD	0.30	31.90	3.90	2.00	0.10
TN	0.20	2.68	5.36	2.44	0.00
TX	0.62	2.48	9.51	2.70	0.28
UT	0.73	4.36	14.00	2.36	0.27
VA	0.35	2.70	5.57	2.78	0.16
VI	0.67	0.33	3.67	1.00	0.00
VT	0.50	2.62	3.38	1.88	0.12
WA	0.52	3.14	6.71	1.81	0.29
WI	0.58	2.58	6.87	2.42	0.32
WV	0.20	1.73	4.27	3.13	0.13
WY	0.90	1.80	3.00	2.00	0.10

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*Source: "Hardware (Average Per Depository)" (1990).

the costs of handling and freight. These rates, Herman (1990) states, would save libraries thousands of dollars.

The ability to acquire equipment is mostly a matter of money. The ability to use it depends on the type of technology and the competency/knowledge of the user. For example, microform is the easiest to use. Except for light bulbs and maintenance (and paper for reader/printers), it is simply a matter of plugging a machine in, turning it on, and telling patrons how to insert the material in the machine.

Microcomputers are probably the next most difficult. With the availability of commercial software, plus the increasing familiarity of some library staff with programming, microcomputers can be made operational without a lot of difficulty.

Compact disk technology poses the most challenges for the lay user. Although compatibility problems seem to be lessening, most products demand some "set up" skills. Undoubtedly this will improve.

It is also possible to use CD-ROM technology on different levels. For example, the Census Test Disk Number 2 of the 1982 Census of Agriculture and the 1982 Census of Retail Trade can be used as print equivalents to search for specific information. It takes knowledge of programming (dBase III in this instance) to make it more efficient (comparisons, rankings, etc.). Traditionally, most librarians have not developed these skills.

Three other issues might also be noted. First, some products can do real harm. For example, the recent episode with the CD-ROM of the County and City Data Book involved an accompanying floppy disk contaminated with a "deadly" virus. This can ruin not only the specific product but also attack systems as a whole. Libraries do not encounter such problems with print products.

Second, clients, either accidentally or intentionally, can cause problems and generate expenses for libraries through misuse of these products. End-user on-line searching can be very expensive, especially if done by untrained searchers. "Hackers" can destroy files or even whole systems.

Still another issue to be addressed is the client who knows how to program and who wants to do his or her own programming, downloading, etc., to improve the information found in electronic products. If the library cannot provide this service, should it prohibit knowledgeable patrons from making their own arrangements?

THE LITERATURE

Recent published literature indicates the extent to which depository libraries have absorbed technology (see also Figure 2-1). Kessler and Daniel (1989) surveyed regional depositories in the spring of 1989. Eighty-seven percent of the responding libraries have access to a personal computer, which was most frequently housed in the documents area. Only six respondents did not have microcomputers with CD-ROM drives. Some 53 percent of the respondents could access a mainframe computer, while 71 percent had access to an electronic mail network. And, finally, the regionals tended to make heavy use of OCLC and Dialog services.

To assist in the preparation of Informing the Nation (Congress. Office of Technology Assessment, 1988), the General Accounting Office (1988) conducted a "users' current and future technology needs. Although the survey did not specifically solicit information about the use of census data, there was coverage of "statistical data." The results showed regional depository librarian interest in the collection of statistical data, over the next three years, primarily in paper copy, microfiche, and compact optical disk, as well as through the use of on-line databases. There was also sufficient interest (over 19 percent of the respondents) in floppy disks, electronic mail or bulletin boards, and magnetic tapes and disks.

In response to the same question, selective depository librarians showed the most interest in paper copy, on-line databases, microfiche, and compact optical disk. Nineteen percent expressed interest in floppy disks, whereas none of the other formats listed generated more than a response rate of 5.9 percent.

TRENDS

As previously discussed, depository librarians adopt technology used in other parts of the library. The trend is toward the adoption of standard technologies that are often PC-based. Libraries therefore want products and services that match these technologies. As suggested in Appendix E, integration of information-handling technologies, both within and outside the library, is likely to be increasingly important in the future.

Libraries want census data. Although librarians have format preferences, they may not understand the range of information technologies used by the Bureau and the impacts of those technologies on accessing census data. A number of librarians have not stayed abreast of new technology developments, have not incorporated products and services based on these technologies, and have a significant learning curve to address regarding new technologies. The learning curve may become increasingly difficult to overcome since the librarians need to use and explain the technologies as well as explain the subject content of census data to users.

RESPONSES/SOLUTIONS

Several of the solutions to the problem of slow absorption of new technologies among depository libraries will be found in the technologies themselves. Compact disk sources, for example, will continue to gain in popularity as both multiple and remote (dial-in) searching of CD-ROM databases become practical realities. Advances in software applications will also speed acceptance of the newer technologies.

The development of inexpensive, user-friendly, standardized access programs that are easy to install and that are accompanied by simple user aids will certainly make implementation of new systems more palatable to a wider depository library clientele. Expert systems applications have vast potential for making census data (or any other information accessible in an automated environment) more easily available through depository libraries. Both the Bureau of the Census and the GPO should explore the potential of expert systems and other forms of artificial intelligence as a means of enhancing access to and use of machine-readable data and information.

Decreases in the capital and operational costs of the newer technologies (hardware, software, and telecommunications, primarily) will also facilitate their acceptance and effective use in depository libraries. Yet, cheaper and easier availability of electronically formatted materials will never entirely obviate the disparities that exist between different depository libraries and their ability to utilize these materials effectively: there will always be the "haves" and the "have nots", and undoubtedly many "have somes" as well.

Just as there are wide gaps among depository libraries in their capacity to acquire and utilize CD-ROM (as well as other recent technological innovations), there are great disparities among depository librarians in their awareness of electronically formatted sources and their expertise in installing, maintaining, and making use of them. Certainly greater personal initiative in seeking solutions to these problems would be helpful, but individual librarians can only do so much with the time and resources made available to them.

Greater institutional support is certainly needed. Whether technological expertise is viewed as appropriately residing at the departmental level or beyond, librarians must begin diverting resources currently spent on collection building or other activities to the support of electronic information services if these services are to be effectively utilized. Sufficient workstations must be available, software installations and maintenance must be timely, hardware repair and/or backup systems must be handy, and librarians must be afforded opportunities and encouraged to take advantage of these opportunities if they are to increase their skills in the use of different systems and offer instruction to make new technologies widely accessible to end users. Given the "increasing innumeracy" envisioned by some futurists, the efficacy of the host library's training and instructional infrastructure will become increasingly important as new formats and technologies proliferate.

SUMMARY ISSUES

- How much can the role and responsibilities of regionals change without altering Title 44?
- If funding is a barrier to the absorption of technology, what can be done to guarantee that the program maintains a certain level of technology use and availability, and that the level matches the products that the Bureau of the Census wants to make available to depository libraries?
- The rate of technology absorption in depository libraries depends on a range of internal and external factors. Is it possible for these factors to be included in a model, and effective and realistic remedies for overcoming barriers identified?
- Should the Bureau of the Census provide direct financial support to depository libraries for equipment and staff?
- If there are substantial changes in information-handling technologies by 2000, will libraries still have the equipment to read CD-ROM products of the late 1980s and early 1990s?
- What support services will the Bureau provide for electronic products?
- Why is there such a discrepancy between the librarian's views that they are coping adequately with the new technologies and the view of some Census Bureau personnel that the librarians are increasingly falling behind in the application and use of new technologies?
- Should the Bureau give the library community, in particular the depository library program more direct attention regarding planning and user services? What form should this attention take?
- What will be the role of the Bureau in the development of "downloadable" electronic bulletin boards and/or a FAX network?

ISSUE AREA THREE

Space limitation and its relationship to the ability of regional and other Federal depository libraries to display and store Census Bureau documents over time.

Many depository libraries have coped with limited space for years. They do not and cannot let that problem interfere with the collection and retention of census products because these products are seen as vital to meeting the information needs of their clientele. Librarians participating in the focus group interviews tended to regard limited space for most depositories as an issue for areas of the collection other than holdings of the Bureau of the Census. As one librarian explained, "if census data appear in paper copy, we'll get it and store it, probably forever. In fact, we might even obtain multiple copies of many titles." According to another librarian, "we'll make sacrifices in other areas of the collection, including congressional material. It is important for us to make room for census publications."

One librarian explained that he weeded the documents collection in large part to make room for new census publications. He is now shifting titles in the collection and trying to anticipate collection growth due to products resulting from the 1990 decennial census.

Depository librarians prefer to collect and use paper copy census publications. According to the librarians interviewed, some end users (primarily students) prefer to use electronic indexes and other reference sources. Once there is better software for searching statistical data on CD-ROM, more people might like to search and manipulate statistical datasets. These users like CD-ROM because they can conduct their searches without needing staff assistance.

Given the importance of census data to depository libraries, the staff wants to collect as much data as they can. Many librarians are accustomed to the collection of different formats, although some libraries (ones with small collections) limit their depository holdings to paper copy, if possible.

Depository libraries gather census publications in microfiche, not because that format saves shelf space, but because the Bureau of the Census releases certain data only in that format. Librarians might also replace worn out paper copy with microforms. Other formats fill in the gaps between what the Bureau provides and what depository libraries can access. Many depository libraries, as already noted, want to increase their access to current census products. At some point, the private sector might develop some CD-ROM products for historical datasets.

Another reason for the collection of microfiche is to retain titles that are deteriorating in paper copy. Depository library planning focuses on providing access to source material from the next census, be it the decennial census or an economic census. At the same time, they want to preserve their holdings of past censuses. Microform can play a useful role in this regard.

In summary, space limitation is not an issue regarding census products. Large depository libraries often seek extensive holdings of census data. Such an approach necessitates the collection of paper copy, microfiche, and CD-ROM.

What might become an issue in the future is the need to accommodate increasing numbers of CD-ROM workstations or other types of equipment necessitated by new technologies. Access to the additional electronic outlets needed to operate microcomputers, printers CD-ROM players, etc., has become a significant problem in a number of libraries. Voice and data cabling inadequacies are another major problem throughout some library systems, and the inability of older buildings to support high-density storage media (e.g., microfiche, maps, and compact shelving) is also a cause for concern.

SUMMARY ISSUES

- What census products do depository libraries need to house and for how long?
- What alternative formats are available for obtaining historical datasets? This is especially important where paper copy is deteriorating.
- How well can depository libraries provide appropriate storage conditions (e.g., climate and humidity) for the new information storage formats?
- Will libraries have to "maintain" 1990 information-handling technologies into the 21st century to ensure continual access to such data?
- How will increased demands or space for electronic workstations affect space allocations for information resources?

ISSUE AREA FOUR

Use of paper documents as a preferred medium for Census Bureau data. Current information indicates that the Federal depository libraries are the single largest user of Census Bureau decennial census documents; they acquire over 25% of the total documents printed from the 1980 census. If the preference for paper as a medium for data dissemination continues in the future, it will have an important effect on the media mix of Census data dissemination.

Based on destruction and sales rates from the 1980 census, it appears that sales declined from 1970 to 1980. "Fewer documents are being sold `over the counter' through GPO than are allocated to the FDLs [depository library program]." ("User Demand for 1980 Census Data Products, 1989). The sale of printed publications to libraries remains level. In addition, the Bureau gave away approximately 17% of all 1980 census publications by 1985 but still retains another 17%. Bureau officials expect this trend to continue for the 1990 census. One implication of this trend is that the average cost per publication may significantly increase, depending on how the GPO prices census publications.

The wording of the question fails to consider that, only until recently, the Bureau of the Census tended to release its publications to depository libraries primarily in paper copy and microfiche. Depository librarians operate within the framework of the format decisions made by the Bureau.[1] They find it confusing, though, that the Bureau has said different things at different times. The librarians mentioned that at one time they were told that only a few 1990 census products would appear in paper copy. Now they know that "an enormous amount of products will appear in paper copy." Of course, this accounts only for a fraction of the data that the Bureau releases.

Most decisions to acquire materials in microform are based on considerations of space, unavailability in paper, protection of existing paper copies, format longevity, etc., rather than user convenience. Another factor to consider is the different role that libraries play in acquiring census data (or indeed, any material). Libraries collect broadly for the purpose of making the big collections available for all kinds of research. Although an individual researcher may use electronic sources to "zero in" on a specific number, libraries want to maintain a broad collection for general use. This is why they are the biggest user of paper documents; these documents act as the source of general information for all users.

Heavy use of paper is also influenced by:

- Patron preference;
- No need for an intervening step (data programming, reading equipment, etc.);
- Ability to accommodate multiple patrons (unlike CD-ROM's where one patron can tie up a machine); and
- No cost (unlike on-line use, for example).

Another advantage of paper (and microforms) is that they present opportunities for finding data by chance; the random find is difficult to replicate in an electronic medium. The requester often lacks the ability to formulate his or her request in a way that matches the data indicators. It is possible, however, to program a CD-ROM to show entire pre-set tables similar to a printed report. This improves "browsability" somewhat. Maps present an especially difficult case in anything except paper copy (Railsback, 1990).

The high demand for certain types of decennial census products in paper format -- notably Volume I, Chapters A-C, the tract reports and maps, and the subject reports -- will continue well into the 21st century. Commercial firms have recognized the ongoing demand for data from earlier censuses and have responded by offering microfilm and microfiche versions of decennial census reports. Just recently Norman Ross Publishing began marketing its reprint edition of the first ten population censuses on non-acidic paper. Plans to reprint all pre-1950 decennial census reports will proceed if demand warrants.

Demand for printed versions of other types of census reports will remain at current levels, if not increase, for the foreseeable future. Series such as County Business Patterns and the geographic reports from the economic and agriculture censuses will be requested in paper because smaller libraries and individual users will want access to just those reports pertaining to their area(s) of interest rather than the entire series. Certain of the Current Population Reports series, including P-20, P-23, P-60, and P-70, are so frequently consulted for reference purposes that the demand for them in paper format will remain steady as well.

Nonetheless, libraries are prepared to receive other electronic formats. Clearly, their preference in the electronic area is for CD-ROM products, but they realize that the future also necessitates the creation of multiple CD-ROM workstations.

One librarian simply stated his guiding principle: "we want paper copy for our state and CD-ROM for everywhere else." However, as he further pointed out, a large academic library might want paper copy for more than the immediate state. To his generalization, some librarians added that they collect paper copy for the surrounding states.

According to the librarians, users could more easily make the shift from paper to CD-ROM than they could from paper to microfiche or magnetic tape. A number of librarians noted that in their library people would stand in lines to use CD-ROM products because they perceived these products as easy to use and as offering better access to high quality source material. Besides, people cannot browse microfiche looking for information or getting ideas about what is available on a topic. They can do this with paper copy and CD-ROM products that allow keyword and subject browsing.

CD-ROM networking, while promising in the abstract, is not yet "state of the art." CD-ROM networks are slow and cumbersome, making it difficult, if not impossible, for more than one person to use the same disk at the same time. Even if CD-ROM networking were better developed, very few institutions could afford multiple sets of equipment, enabling more than one person to use the equipment at the same time. On the other hand, it is very easy to purchase a duplicate or triplicate copy of a very heavily used volume, enabling more than one person to use the source at the same time (Herman, 1990).

Perhaps in the future scanners might become standard equipment in depository libraries. These machines transfer information from paper to machine-readable format. Today's scanners cannot handle statistical tables very well, but tomorrow's scanners are certain to do so. Scanners will enable users to use retrospective census data in spreadsheets and databases, together with data to be released through the 1990 decennial census.

PLANNING

Both the Guidelines for the Depository Library System (1988) and the Federal Depository Library Manual (n.d.) identify basic or core titles that all selective depositories should receive. On the list are the census of population and housing (for that state), the Congressional District Data Book, County and City Data Book, the Bureau's annual catalog, and Historical Statistics of the United States. Perhaps the library community might re-examine the core list and develop categories for which CD-ROM products will become most useful for the purposes of data manipulation and downloading.

TRENDS

Paper copy remains important for both current and historical holdings. The librarians interviewed are very concerned about preservation of the historical record, and want the GPO to disseminate paper copy of census publications only on non-alkaline paper. The presumption is that, by the end of this decade, the GPO will only print publications on such paper. Apparently, the problem now is that non-alkaline paper is more expensive and produced in limited quantity.

The Bureau does not appear to consider paper documents to be the preferred medium for user products. Indeed, there is increased likelihood that more data will be made available on CD-ROM in the future and less in paper copy. "Dual format" publication probably will not materialize although many librarians would like such a choice (paper copy and perhaps CD-ROM). Dual format assumes that libraries could receive the same data in either format. Actually, the Bureau uses paper for printed publications and CD-ROM provides access to the same data contained in computer tape databases. Dual format, except perhaps on a very limited basis, is often impossible because the databases available on magnetic tapes and CD-ROM are simply too large to publish in their entirety in print form.

As the Bureau makes more data available in electronic format, the proportion of data in print to the total data accessible may decline. There is some "evidence that the amount of paper produced was twice as much in 1980 as 1970 due to the more breakdown in ethnic characteristics and to the Neighborhood Statistics Program (in 1990 it is called User Defined Areas Program" (Rowland, 1990b). The Bureau is "trying to hold 1990 level of paper to an increase of no more than 20% over 1980" (Ibid.).

SUMMARY ISSUES

- Will libraries of the future want non-alkaline paper replacement for census publications of today and yesterday?

- Which census publications are most useful -- have the broadest appeal to depository libraries? The library community should re-examine the list of core census lists for all depositories to take.

- Costs for producing paper copies of various Bureau publications may increase significantly in the future. While this will not affect the first publication obtained by the depository, as long as the GPO remains the printer and prices publications in accordance with the stipulations specified in Title 44, United States Code, the cost of obtaining replacements and duplicates will be affected.

- The Bureau has no plans for dual format publication yet depository librarians believe that they should have a choice about receiving a particular item in one format or another. What role might the private sector play?

- What data do depository libraries need? What types of data should be placed on CD-ROM or any other format?

- How are census products in different formats used? How can the findings of such studies be linked to product design and availability?

NOTE

1 According to Rowland (1990c), "the goal for 1990 is to hold the amount of paper to no more than a 20% increase over 1980. Although there are no goals for 2000 the trend toward use of electronic products especially for high density files is likely to increase. If electronic products become easier to access, less paper may have to be printed in any standardized format.

Since the Federal Depository Libraries are the single largest user of standardized printed reports, the direction they take will be important for future decisions concerning paper products.

ISSUE AREA FIVE

Use of other media, both new (CD-ROM) and old (microform) as storage devices and the possibility of such storage media replacing paper for historical data and for current retrieval.

Depository librarians believe that paper copy has an important role, now and in the future. They challenge the assertion that printed reports will remain important for the 1990 census, but not thereafter. Paper copy is extensively used and does not require special equipment to use and can be shared by others simultaneously. In the opinion of the librarians interviewed, paper copy is most useful for the provision of national summaries and data on one's own state. The assumption is that end users want to look up particular information and not manipulate data. Simply, this might be referred to as reference use. Paper copy used for such purposes deteriorates, however.

Brenda McDonald (1990) of the St. Louis Public Library summarizes the role of paper copy, in comparison to CD-ROM, thusly:

> At present when a library receives geographical data from the Census we have the option of purchasing additional volumes for our state or metropolitan area in order to handle the multiple requests for regional statistics received at the same time at a reference desk. This also helps the library handle loss of a volume due to theft or overuse. With a CD the library is looking at the purchase of not one volume, but additional CDs (unless [the] library has networking) which contain multiple volumes not needed and at a higher cost (at present). Additionally, the library needs multiple workstations at a high cost to accommodate multiple requests received with the same period of time. Paper is, therefore, more practical to the library than CDs in accommodating patron requests and regarding costs.

Moreover,

> patrons may like CDs and libraries may like CDs -- but for two different reasons. I want the CD for the additional data it provides in order to fulfill patron queries - but I want the paper to continue in order to serve as many patrons as possible at the same time or in a timely manner. This is especially evident at college libraries with class assignments and many students asking similar questions which are answered in one source.

Reproduction of data contained in CD-ROM products necessitates that the library have printers and that end users download datasets. Libraries must lease or purchase photocopiers, microfiche reader/printers, and computer printers. The more users and machines that libraries obtain, the greater are the costs to the libraries.

When end users want to make research uses of census data, perhaps CD-ROM becomes a more significant format. The data can be downloaded and manipulated (e.g., by zip code). Users may want to search for information themselves, to upload datasets, and "to manipulate data either by entering it into a model or using it to make calculations" (Drake, 1989, p. 1). Moreover (Ibid.),

> Paper-recorded data must be re-keyed prior to manipulation; therefore, the cost and inconvenience of paper increases both because of its storage requirement as well as the labor intensive requirement of scanning/re-keying.

Depository libraries stressed the importance of maintaining their paper collection of historical data. Microforms, especially those with a silver halide base, become an important storage mechanism when paper copy deteriorates. There are still unanswered questions about the longevity of electronic products, including CD-ROMs. "The Census as a historical record is very important ..." (Garner, 1989), and "there must be consideration for permanent preservation of information in some format" (Redmond, 1989, p. 2).

Of course, the National Archives and Records Administration stores government records in perpetuity. Complicating matters, Congress authorized the destruction of most economic census records from 1890 through 1939, without microfilming. Although magnetic tape came into use with the 1954 census, older tapes are useless. The equipment to read the tapes became obsolete years ago. Only when the records of the 1972 economic censuses became available at the National Archives in the year 2022 will researchers and genealogists have access to a wealth of primary source material. Clearly, this experience has had an impact on the depository library community. Librarians are concerned that future technologies may replace present ones, and result in an inability to use the census products of today. Furthermore, they question the role of the depository library program as an archive and complement to the National Archives.

The discussion of issue area 5 involves an examination of different formats.

Microfiche

Limited data were available from the 1960 and 1970 censuses on microfilm. "Microfiche was first used as a major product medium for the 1980 census" ("1990 Census of Population and Housing:

Tabulation and Publication Program," 1989, p. 7). Some materials from the 1980 census, including block statistics and maps, were supplied as depository items only in microfiche. "Microfiche provides the detailed area data shown on selected summary tape files to those users who do not have the computer resources to access the data" (Ibid., p. 8). Microfiche offered a means of access to data not contained in paper copy. Additional advantages were that it is "a fairly inexpensive way to provide a great deal of data" (Ibid., p. 7) and that the equipment to read it is relatively inexpensive.

The Bureau sells microfiche products produced from tape files. However, the Bureau has (Ibid., p. 25):

> determined there is a user demand for microfiche, but its use is decreasing because of the increased use of other media like CD-ROM. As a result, the number of products issued on microfiche will be limited.... We will re-evaluate the need for microfiche later in the decade to determine if there is still a user demand for this dissemination media.

Indeed, one Bureau of the Census reviewer of an early draft of this report believes that "microfiche will become less and less important and may be nonexistent for 2000 except for archival purposes." CD-ROM might become the replacement medium.

Libraries have used microform as a storage medium and continue to do so. Despite patron dislike and the necessity for having reading devices, many libraries have large microform holdings. Space savings, cost, unavailability of paper counterpart, preservation of fragile volumes, and longevity are all reasons for choosing microforms.

Microform is unlikely to replace paper for storage of data as long as libraries have a choice. For current use, with emphasis on quick, discrete data item retrieval, microform is slow and unwieldy. Microform is useful for storage of large amounts of older, less frequently used materials. The infrequent consultation of this information offsets the inconvenience of usage.

Microform is less likely to replace paper than to act as a backup for paper, especially to preserve older and more fragile materials. When libraries discard old census volumes on paper, it is likely to be because the paper is too worn to be functional.

Many of the librarians interviewed personally do not like microfiche. It is "ick;" it is difficult to use and the quality is often bad. "We take microfiche when there is no other choice." In effect, microfiche selection, some of the librarians believed, will be a "dead issue" if the Bureau of the Census relied on other distribution formats. Other librarians questioned what type of census material would end up on microfiche. Microfiche, they explained, is not the best format for the presentation of maps, for instance.

The assumption is that micrographics technology will not improve that much or that if it did, libraries might not commit that many resources to it. Perhaps microfiche might be a more attractive alternative if the technology improves. Three problems, however, are:

- Discrete items cannot be easily identified and retrieved;
- Reading, printing, and duplication equipment, plus cabinets and environmentally controlled storage areas, are necessary for efficient use of microform materials; and
- The datasets cannot be manipulated and downloaded.

The GPO staff interviewed also did not favor microfiche distribution due to internal operating procedures and work load impact. There is currently a large backlog of publications awaiting conversion to microfiche that has not been distributed to depository libraries. If this backlog extends to the 1990 and subsequent census products, the timely dissemination and use of census data by library clientele will be seriously impaired.

A final issue concerns the longevity of microfiche. This issue has been extensively investigated (see Hernon, 1981). Longevity, however, varies according to factors such as storage conditions, amount of use, and composition of the microfiche product itself.

Magnetic Tapes

The Bureau sells both summary tape files and public use microdata files. This dissemination program started in 1965 with the sale of computer tapes covering the 1960 Census of Population and Housing. According to many depository librarians, magnetic tapes are "out of our league" because they require the use of mainframe computers, special storage, programming, etc. that limit their utility to many depositories. Some libraries, however, can handle and want access to this format. The majority of librarians interviewed believe that State Data Centers provide a more hospitable home for magnetic tapes. In addition, the private sector can (and should) develop products from the tapes.

For access to magnetic tapes, many depositories would refer their users to State Data Centers, in the case of academic depositories, or use the resources of the Inter-University Consortium for Political and Social Research (ICPSR), a partnership among more than 300 universities and colleges in the United States and elsewhere. Housed in the Institute for Social Research at the University of Michigan, Ann Arbor, it provides a central repository and dissemination service for machine-readable social, economic, and political data on national and international levels.

In 1990, the Research Libraries Group, Inc. and OCLC announced plans to exchange cataloging data for computer files of the ICPSR. As a result, users of OCLC and the RLIN system will have access to the complete holdings of the ICPSR.

Such a service benefits academic libraries. An important issue relates to the general public and what are the public's needs for data contained on magnetic tapes. Presumably such people would have to rely on State Data Centers and pay a fee. Nonetheless, here is a topical area requiring further research and discussion.

Flexible Diskettes

In 1984, the Bureau offered the County and City Data Book and County Business Patterns on diskette. According to Williams (1989, p. 3),

> We currently offer half a dozen products for sale which are extracts of computer tape files but designed specifically for flexible diskettes. In the fall of 1986 we also announced a tape-to-diskette downloading service in which any tape we have in our inventory will be downloaded directly to diskette.

However, "in general, flexible diskettes do not excite us [the Bureau] as a means for data dissemination" (Ibid., p. 4). The reason is that "their [storage] capacity is simply too limited" for many census files (Ibid.). Smaller files are probably more efficiently distributed via CENDATA or the bulletin boards (Ibid.).

Williams (Ibid., p. 5) inserts a qualification, however:

> A possible exception to this rule are diskette products that involve data and software combined in a "turnkey" application. Although we do not plan to develop any future general purpose software products for public use, we will be developing such self-contained applications for use on our IBM microcomputers for our exhibit program. We may disseminate these products on a "caveat emptor" basis -- we will simply provide copies of what "runs" on our equipment. If the purchaser cannot get the "exhibit demo" to work on his microcomputer then we will not be in a position to provide any support. These applications are designed more for flash than substance (they contain limited data), but we anticipate that many of our diskette orders would be for such products.

As the storage capacity of flexible diskettes increases, the means of distributing census products may become more prominent. However, flexible diskettes will probably remain a secondary means of data distribution.

Floppy disks are aimed more at end users than libraries, and may require special configuration to work on certain microcomputers. Often libraries would have to obtain vast numbers of disks and written documentation. Furthermore, the staff would have to learn different packages, show users how to manipulate the data, and enter data into hard disk drive memory. In the case of census products, floppy disks often correspond to printed publications. They do not contain additional data; for this reason and because of their format, floppy disks have limited value to depository libraries.

Libraries prefer CD-ROM because floppy disks have relatively low storage capacity. This may necessitate the loading of multiple disks into computer memory. In addition, disks may provide only data, without corresponding access software to manipulate datasets. And, diskettes have low storage capacity in comparison to CD-ROM.

CD-ROM[1]

CD-ROM (Compact Disk -- Read Only Memory) is a type of optical disk. One 4-3/4 inch CD-ROM can hold the contents of 1,600 flexible disks or 3 to 4 high density tapes (Williams, 1989, p. 6). Production of a master disk cost approximately $1,300 in 1989, but the copies are inexpensive -- about $2.00 in 1989. As Williams notes (Ibid., p. 11), "although we plan to distribute our CD-ROMs to the Federal Depository Libraries whenever possible, some discs that we produce may not be appropriate for the library environment." For example, the American Housing Survey -- National Core (AHS) microdata file is available in CD-ROM, but in a SAS format and as a ASCII SDF file. The Bureau found it impractical to configure a dBase III format for the AHS.

The GPO did not distribute the TIGER/Line prototype but will make limited distribution of TIGER/Line Precensus. The GPO anticipates full distribution of TIGER/Line Postcensus.

CD-ROM is a most important evolving technological application for depository libraries. These datasets can withstand extensive use and library clientele can use them either for reference purposes (look up a statistic) or engage in research (data manipulation and comparisons). According to one librarian, CD-ROM contains "the bells and whistles" and lets "everyone be a contender in the provision of electronic information." Moreover, data can be downloaded to floppy disks and support new uses.

CD-ROM satisfies the information needs of more sophisticated users. It provides them with information, such as zip code, so that they can make more detailed analyses and comparisons than they readily can from paper copy. At the same time, students like to use CD-ROM. They will stand in line to use it, even if a print counterpart is nearby.

The biggest impact of CD-ROM is the fact that without access to jukebox technology, one person at a time "ties up" equipment and a product.

CD-ROM is a both a replacement for and supplement to on-line database searching. Some library users need additional or more current data than those appearing on CD-ROM. They therefore need to consult electronic bulletin boards or on-line databases.

CD-ROM is beginning to make its appearance in depository libraries as a storage medium. Whether it will actually replace paper is unknown. Some libraries have expressed a preference for CD-ROM and/or on-line access to remote databases with good retrieval software at a reasonable cost instead of either paper or microform (Whitney, 1990). Because CD-ROM use is as yet less straightforward than paper, access to data on CD-ROM (or on-line, for that matter) raises the issue of client and librarian technological sophistication.

GPO staff wondered about the impact of services such as "BRS after Dark" if they became cheaper to search and if more users could be accommodated. Clearly, CD-ROM is increasingly becoming advantageous for serving greater numbers of users.

Although "everyone is still adjusting to CD-ROM," the librarians and GPO staff interviewed would like a dual format choice, not paper or microfiche but paper and CD-ROM. Such a preference fails to consider that CD-ROM provides access to data not available in paper form. (The presumption is that the Bureau is willing to expand or keep its current level paper copy distribution.) The Bureau produces CD-ROM disks at two levels:

- Level 1: This is a format very similar to a tape file, except that it takes advantage of a few indexes that are considered standard or basic. These are usually on the disc in a "standard" format, such as dBase. Level 1 discs are designed so that data are easily separated from software (an open architecture); dBase is one of the preferred formats for use on CD-ROM; and
- Level 2: In contrast to Level 1, the data are usually in a proprietary format and cannot be used separately from the software. These are usually text applications and are highly (keyword) indexed.

Although the Bureau recognizes this distinction, it has not produced any Level 2 discs; all of its discs are Level 1.

As with electronic records in general, the librarians raised questions about the preservation of CD-ROM and whether newer versions merely updated or replaced previous editions. They were concerned about the role of regionals and research libraries in the preservation of the historical record. With some exceptions regionals must receive and maintain permanently all depository publications as provided in the *Instructions to Depository Libraries* (1988)."[2] They should also attempt to complete their retrospective collections of significant works.

The librarians questioned the longevity of CD-ROM and noted that if a CD-ROM got lost or damaged, they would lose much valuable data. This suggested to them that the depository program and/or the Bureau of the Census might have to explore replacement options. The GPO's Library Programs Service provides replacement copies for mutilated or missing publications from the *original shipment only*.

With replacement, availability perhaps more than cost is the central issue. The GPO does not have a fulfillment role, however. It neither presses copies of CD-ROM nor maintains archival copy. However, it does obtain extra copies of CD-ROM, but only for filling claims. The policy meets short-term, rather than long-term, needs. The GPO staff interviewed believe that replacement copy would have to come from the Bureau of the Census. Perhaps the private sector might be another option. The availability of replacement copy might change in the future when technology permits easier copying of CD-ROM. It is important to emphasize that this solution applies to public domain software.

As technology continues to advance, the equipment of tomorrow may no longer be able to read the CD-ROM products of today. Libraries therefore would house census material that is inaccessible. The librarians interviewed are concerned about the obsolescence of technology and any emerging inability to retrieve data already held within their collection.

Whatever CD-ROM products enter the depository program should be easy to use. The librarians stressed end-user friendly as an important consideration. The dataset must be simple for both librarians and library clientele to use and manipulate.

When asked which groups were not receptive to the use of CD-ROM, the librarians interviewed could not offer suggestions in context of the categories specified in the answer to question 7. Rather, they said:

- Those not computer literate or able to download files and use particular software packages, e.g., dBase; and

- Those unable to read or have a low literacy level.

Age may become less of a factor as the youth of today have greater opportunities to become computer literate in school and to obtain keyboarding skills. People who are illiterate or semi-literate present the most problems. However, they tend not to be library users. Needless to say, increased illiteracy will have a negative impact on the use of census and other works held by libraries, regardless of the medium in which the data appear.

It should be noted that in October 1989, the GPO surveyed depository libraries (special survey 89-300) about CD-ROM and selected microfiche products. They queried the libraries about their wanting County and City Data Book on CD-ROM (item 0151-D), which is the equivalent to the print source, and County Business Patterns (item 0133-E), which is not the same as the print counterpart. Item 0154-B-01 "is in a catch-all class for miscellaneous CD-ROM products from the Census Bureau." "By establishing this item, the GPO is prepared to order copies of future CD-ROMs as they become available." The other items in the survey pertained to the Toxic Chemical Release Inventory on CD-ROM and state, District of Columbia, U.S. summary, and outlying areas on microfiche.

Some 700 libraries opted for the "catch-all class," 740 for County Business Patterns, and 772 for County and City Data Book. Expressed another way, at least half of the depository libraries selected a census CD-ROM product.

Electronic Bulletin Boards

This category, in part refers to CENDATA^{tm}, an on-line service that began in 1984. Available through Dialog and CompuServe, CENDATA offers current economic and demographic data for the United States and demographic data for more than 200 countries. It includes monthly economic indicators released by the Bureau (e.g., trade balance). Furthermore, the database includes other data on manufacturing, business, foreign trade, construction, governments, and agriculture. There are also monthly time series data on key national economic indicators.

Demographic data available in the database include current household, per capita income, and population estimates for all states, metropolitan statistical areas, and counties as well as national-level data on topics such as school enrollment. In addition, CENDATA provides annual business data at the county level and demographic and economic profiles for each state and metropolitan statistical area.

CENDATA offers textual information -- "press releases, area profiles, and information on product availability" (Williams, 1989, p. 3). For the 1990 census, CENDATA will provide up-to-date information about product availability and will contain limited census data. According to the Bureau ("1990 Census of Population and Housing: Tabulation and Publication Program," 1989, p. 8),

> The information on product availability is particularly important since most census products are issued on a State-by-State basis as the processing of each State's data is finished. That is, the data released today for one State may not be available for another State for several weeks.

Users of CENDATA include "public, academic, and corporate librarians, state data centers, trade associations, banks, market researchers, other Federal agencies, and investment companies" ("Statement before the Subcommittee on Government Information, Justice, and Agriculture," 1985, p. 5).

Some librarians regularly consult CENDATA for coverage of release dates for census publications. Apparently, for some libraries, there is less interest in the national data summaries. GPO staff suspected that depository librarians might be interested in the bulletin board available from the State Data Center staff, Data User Services Division, Bureau of the Census. This service provides State Data Centers, and some libraries, with access to local data. As such, it rounds out other data that some libraries collect on their state, counties, and local communities.

Some librarians interviewed expressed no interest in electronic bulletin boards, while others were quite interested. The former regarded bulletin boards as a resource useful for information providers other than depository libraries. For them, bulletin boards provide perishable, not permanent, data. Moreover, they noted the training involved in the use of bulletin boards, the equipment needed, telecommunications costs, and the necessity of having staff to monitor the use of the system.

The others considered bulletin boards as a valuable way to provide instant communication and very current information. The Department of Commerce's Economic Bulletin Board (EBB) is one of the electronic pilot projects for the depository library program. The EBB provides statistical press releases generated by various agencies, including the Bureau of the Census. Press releases convey timely information and may be available from issuing agencies in limited quantity. Subsequent attempts to acquire them can be costly and futile.

The only equipment required to access EBB is a PC terminal, modem, and communications software. Subscribers, however, may use personal computers to download data to floppy disks for subsequent review and manipulation. As more libraries experiment with EBB, the popularity of such a resource might increase. Some libraries have lost paper publications that contain the same (or similar) information that appears on EBB.

Electronic bulletin boards and on-line databases play an important role when librarians and end users need access to timely information. As Shill (1990) notes, we need to "satisfactorily address the questions of 'who pays' ..., user training, user-cordial searching software, and staff support." Some services bear no user charge other than telecommunications fees; perhaps reduced rates or a minimum level of free service for depository libraries could be negotiated.

At any rate, more depository libraries, and their clientele, need to become familiar with the contents and operation of electronic bulletin boards so that these valuable resources receive more use. Academic libraries can upload (and some have done so) bulletin boards for campus-wide use.

Electronic Mail (E-mail)

Electronic mail provides a means whereby libraries can transmit and receive messages. They can also upload, download, and transmit datasets. Such a capacity enables a library to increase its access to census data and to replace small datasets that have been mutilated or misplaced.

A 1988 survey of members of the Association of Research Libraries (ARL) discusses the use of e-mail for interlibrary loan, administrative purposes, and communication with users through an on-line catalog. The report identifies both the strengths and weaknesses of e-mail (Electronic Mail, 1988), and notes that the use will increase.

In 1989, GOVDOC-L, an electronic network conference, began operation over BITNET.[4] This electronic conference is a medium to discuss a broad range of topics related to government information resources and policies. Users regularly upload source documents and government information to disseminate among all conference participants. There is increasingly wide use of this conference by depository librarians -- especially those in academic institutions connected to BITNET and the INTERNET.

Once contact is made on the conference, personal communication between individuals can proceed via e-mail. The growth and impact of such conferences, and the use of e-mail as a means of communication among depository librarians, is likely to increase.

It merits noting that Western Union Corporation has introduced its "Executive Briefing Service," which delivers business news and timely information on different topics to a customer's facsimile machine or electronic mailbox. This service provides access to newswires, press releases, trade journals, government reports, patent documents, and newsletters. Obviously, this service will not impact some library users but it might others. Consequently, libraries might make only selective use of electronic mail for access to timely government data.

On-line Database Searching

In the case of documents librarianship, on-line searching may be losing its importance in comparison to CD-ROM searching. Many users want to search for information themselves as opposed to having a librarian conduct an on-line search.[3] On-line searching can be costly and requires the use of trained staff. End users often can only conduct simple searches such as through the files available on "BRS after Dark." The librarians interviewed did not consider "BRS after Dark" as a suitable mechanism for revising their estimation of on-line searching as becoming less important.

Perhaps the amount of on-line database searching performed might increase if telecommunications and on-line access costs were lower. Nonetheless, on-line searching does not have the mass appeal of CD-ROM searching, in which end users may not have to make appointments and go to special locations.

Role of Bibliographic Utilities

In February 1990, OCLC introduced a new cataloging service for depository libraries. Called GOVDOC, it is designed to enable depository libraries to use GPO machine-readable cataloging records for their own local depository holdings. OCLC can provide MARC records of government publications at an affordable price to many depository libraries. Each month, OCLC produces OCLC-MARC tapes or catalog cards for items distributed through the depository program. Libraries can use a customized order form to indicate which item numbers they want and whether they want tapes, cards, or both. Regardless of whether the library is a member of OCLC, the organization will attach an OCLC institution holdings symbol to the record in the database. This facilitates interlibrary loan of government publications, thus having a multiple effect on usage.

Maps

The Bureau offers block, tract, and county subdivision maps, as well as statistical or thematic maps. Voting district outline maps "will show voting district numbers and boundaries as well as the underlying features such as roads, railroads, and rivers." These maps will also "show the boundaries and names of counties, county subdivisions, and places" ("1990 Census of Population and Housing: Tabulation and Publication Program," 1989, p. 42). The Bureau will produce maps resulting from the 1990 census electrostatically. These maps will be available from the Bureau's regional offices for a fee. Some librarians interviewed suggested that in the future the Bureau and the GPO cooperate to make maps easily accessible to libraries on CD-ROM.

User-Defined Areas Program

This semi-customized product will be available on a user-fee basis. The Bureau can "produce data for locally specified geographic areas not available in standard census products" (Argana, 1989). The primary objective of this program "is to process requests for data for specialized geography efficiently to ensure timely delivery of the program products for reasonable user fees" ("1990 Census of Population and Housing: Tabulation and Publication Program," 1989, p. 43).

There is only minimal interest in this program by those depository librarians interviewed. Generally, they believe that users with such special needs should rely on their own resources or those of their organization to obtain such specialized information.

Special Tabulations

This fee-based service allows customers to specify geographic areas or subjects not available in standard census products. Customers can request "specialized cross tabulations, product formats, or geographic areas which require splitting blocks" (Ibid., p. 44). Moreover (Ibid.),

> The computer process for this program generally involves retabulating data from the confidential internal record files. The Census Bureau prepares these special tabulations on a user-fee basis.
>
> Tabulations which are reaggregations of existing data from summary tape files or microdata files are excluded from this program. These types of tabulations may be obtained from State Data Centers or private data vendors.

Clearly, libraries are searching for ways of incorporating data descriptions into their on-line bibliographic records as a means of providing greater awareness of data availability to the users through on-line catalogs (see Freivalds and Carson, 1990). But, they have minimal interest in fulfilling specialized requests that require the purchase of such special tabulations.

Downloading Data

Regardless of the electronic format, it is likely that more people will download census data and manipulate the data to obtain specific types of information. Most depository libraries, including regionals, are unlikely to have the staff time to act as intermediaries in assisting patrons with downloading and the resources to provide such individualized services themselves. However, some libraries already do this, and foresee the transmission of data sets via e-mail. Perhaps libraries needing replacement copies or part of a dataset not locally held can use such a service and download the data as needed.

Some librarians interviewed expressed interest in not only access to newly released census data but also to the availability of aggregate data, whereby either the public or private sector massages different datasets and creates a new product. Access to census data is critical, and as this example illustrates, librarians want even more, hopefully in a format that is easily used.

Some libraries now download data, e.g., from EBB and enter it into their own on-line system. By the next century, more depositories will undoubtedly do the same.

RETRIEVAL CONCERNS

One aspect of this issue area deserving more attention and research is the belief on the part of a number of interviewees that while great strides have been made in storage technologies, only minimal advancements have resulted in retrieval effectiveness. In short, while the Bureau of the Census can now store huge amounts of data on CD-ROM, magnetic tape, etc., the effectiveness with which those data can be retrieved is still problematic.

A number of interviewees recommend that the Bureau of the Census carefully consider and improve the means by which data can be retrieved from all of the various formats discussed earlier in this section. Indeed, there was a very real concern that while the Bureau is doing a good job of storing data and utilizing new technologies to place more data in smaller storage facilities, those data can be increasingly more difficult to retrieve.

SUMMARY ISSUES

- Will paper copy always play an important role for libraries in housing and servicing census products?
- Will CD-ROM, to a large extent, replace on-line searching?
- How can the Bureau of the Census communicate more effectively with depository libraries? For example, how can they inform the libraries that dual format is not a viable option?
- What is the longevity of CD-ROM? Who is responsible for archiving it?
- What are the replacement options for CD-ROM?
- Should the Bureau only offer the GPO and depository libraries CD-ROM manipulable in dBase format? Which data sets (and retrieval software) are appropriate and not

appropriate to offer depository libraries?

- o What role should the private sector play in the distribution of census products to libraries?
- o What criteria can the Bureau of the Census adopt to provide depository libraries with the types of CD-ROM products they want?
- o What differences are there between print publications and CD-ROM counterparts?
- o How can State Data Centers improve public access to magnetic tapes?
- o Can both users and libraries perform uploading and downloading functions effectively and efficiently?
- o What support can/should the depository program receive so that staff can provide individualized services that electronic formats offer?
- o Are depository libraries willing to settle for the "Yugo" when the Bureau might be willing to offer "Cadillacs?" How can the dialogue between the Bureau and librarians be regularized and improved?
- o Librarians believe that the CD-ROMs from the Bureau will be at level 2 when in reality most of them are being produced at level 1. How can such an impression be corrected? Moreover, the current level 1 CD-ROMS are similar to tapes. Do librarians really want access to these? If yes, how extensively?
- o If technology makes CD-ROM more user friendly, and if jukebox technology greatly advances, will libraries be more willing to substitute CD-ROM for paper copy? Perhaps a document might be less densely packed with data, but that document might have a pocket part containing a CD-ROM disk offering access to more data? Would such a package be practical for both the Bureau and libraries?
- o How will, or should, librarians gain specialized software skills for downloading data and assisting patrons to manipulate the data from CD-ROM?
- o How do we keep depository libraries from becoming overwhelmed with the amount of data that might be released to them? Which datasets do they need? Can we develop priority levels for these datasets?
- o Can the Bureau supply disks, documentation, and software promptly to the GPO so that the GPO can reproduce and distribute the materials in a timely manner to depository

libraries?

- What happens to publications and electronic products retained in the Bureau? How does the National Archives preserve and provide access to the source material forwarded by the Bureau?

- How many CD-ROM stations can a depository service? Can the library dedicate a station to census products? Assuming that jukebox technology permits multiple access to CD-ROM products, which products should be loaded? It must be remembered that the depositories might want to provide access to CD-ROM products other than those emanating from the Bureau of the Census.

- How much value-added capability should the Bureau provide for its CD-ROM?

- What steps can the Bureau of the Census take to improve the retrieval of data in its various products, rather than simply stressing mass storage of data?

- What role should research libraries play in the provision of public access to data contained on magnetic tapes? If they do not play a role -- servicing these tapes -- are they lessening their research role in the information and electronic ages?

- In a PC-environment, there are increased opportunities to interact with mainframe computers and use magnetic tape. With CD-ROM some library clientele might want to upload census data for their research use. How will such requests be handled? What additional services and expenditures will such a role necessitate?

NOTES

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1 At the time that we conducted the Focus Group interviews, the only census disks available through the depository program were Test Disk 1 and 2 " -- and most libraries did not receive Disk 1 or could not get Disk 1 to work" (McDonald, 1990). Therefore, the following discussion focuses more on CD-ROM in general and its long-range usefulness to depository libraries.

2 According to Appendix C of the Instructions to Depository Libraries (1988, p. 1). "Regional depository librarians should be especially cautious in discarding materials which might be valuable for research or historical purposes. All newsletters, announcements, etc., that are identified in this list should be kept regardless of the retention time recommended. Only those publications which are superseded by later editions or cumulative compilations may be discarded by regionals."

3 For illustrative purposes, it might be noted that the Evansdale Library, West Virginia University, got ERIC on CD-ROM in the summer of 1989. In the fall 1988, the staff conducted 123 on-line searches. In the fall 1989, they only did 34 such searches. In contrast, there was an estimated 952 CD-ROM searches (Shill, 1990). "Electronic searching of ERIC increased by a factor of 8.02 (total) in the course of one year, while intermediary searches on a cost-recovery basis dropped 72%" (Ibid.).

4 For additional information regarding GOVDOC-L contact Diane K. Kovacs, Moderator of GOVDOC-L, Government Documents Coordinator, Bucknell University, Lewisburg, PA 17837.

ISSUE AREA SIX

Structure of the Federal depository library program and how that structure may affect dissemination of Census Bureau data to depository libraries.

BACKGROUND

A number of depository programs distribute government publications for general use by the public. The Federal government, as well as state and local governments and international organizations, operate such programs. At the Federal level, depository programs have been established by the Government Printing Office (GPO), the Patent and Trademark Office, the Geological Survey, the Bureau of the Census, and so forth. The best known of these programs is the one administered by the GPO.

A depository program is a cooperative endeavor between a government and libraries, in which each gives and receives something. The government provides free publications, in return for a commitment that these publications will be available to the general public. The libraries, in return, want many of these publications and realize that, without depository status, they would have to either purchase them or expend considerable time and effort in monitoring new publications and publishing activities and in preparing and submitting requisitions. Depository libraries benefit from the arrangement; they receive publications free, automatically on standing order.

Any structural changes in the depository library program, as well as expansion in the types of "informational matter" disseminated through the program, must conform to the provisions of Title 44, Chapter 19, of the United States Code.

Chapter 19 defines a government publication and specifies the types of publications eligible for depository distribution. There are two types of depositories, regionals and selectives. The regionals must first be selective depositories and then apply for regional status. The chapter defines the roles and responsibilities of both regional and selective depositories.

By law, with the exception of the highest appellate court library in a state, both congressional and law designated depositories are required to make publications available for the free use of the public.

The chapter also sets out the relationship between the GPO and depository libraries. The GPO can inspect the conditions of the depositories and take corrective action as necessary. Failure to comply can result in the removal of a library's depository status.

Regional Depositories

The 1962 Depository Library Act (P.L. 87-579, 76 Stat. 352), among its other provisions, created the system of regional libraries. These libraries, limited to two per state, were charged with the maintenance of comprehensive collections held permanently, the provision of interlibrary loan and reference service, and assistance to other depositories in the disposition of unwanted publications. Regionals oversee depository collections and services within the area of their jurisdiction, usually a state. The highest appellate court libraries and Federal libraries are the exceptions. Federal libraries discard unwanted documents through the Library of Congress and the National Archives and Records Administration.

Based on the recommendations of "the state library authority and a majority of depository libraries within the region," a Senator from the state designates a library as a regional. A library may surrender regional status and revert to a selective depository. If a regional returns to selective status and if there is still an active regional in the state, then the former one may discard (with the permission of the remaining regional) any depository materials held for over five years. In other words, the former regional is treated just like any other selective depository. In some instances, currently existing regionals have asked former ones to continue to house their collection until such time as the remaining regional can absorb the former regional's valuable discards.

Today, there are 54 regionals. According to section 12-1a of the Guidelines for the Depository Library System (1988), "... regional status may be shared by more than one library." In both North Dakota (the first such example) and South Carolina, two university libraries serving as selective depositories share regional status. One library, in effect, is the nominal regional but shares its responsibilities with another library in the state. If, by chance, a third library applied for regional status, the cooperating library might discontinue its role as a supporting regional or itself apply for regional status. The nominal regional might assume the extra responsibilities and displace the cooperating library, or develop a partnership with the library applying for regional status. Clearly, different alternatives might be pursued.

Regional depositories can be likened to the foundation of a building: either they provide the basis by which the entire depository library program grows and meets its statutory responsibilities, or they are unable to assist other depositories and meet challenges effectively. Both the GPO and the library community are trying to prevent the foundation from becoming increasingly shaky and to assist the regionals in accomplishing their intended purpose. The number of regionals may never exceed 54, while a decline in the number would have broad implications for the depository library program, that is, unless a regional in another state assumed interstate responsibilities.

To provide relief to regionals, the GPO has developed strategies such as shared regional status, "mini administrative distribution centers," and an expanded concept of superseded titles subject to deselection. These strategies might be interpreted as comprising a legal gray area. Undoubtedly the size of that gray area will expand unless new legislation is enacted.

Issues

For years, regional librarians have complained about the amount of material that they receive and must permanently house. (Their complaints, however, have been in reference to sudden outpouring of maps and Department of Energy reports, not census publications.) They have also pointed to space constraints and financial stringencies that they face. Given the language of Chapter 19, the GPO cannot create a hierarchy among regionals or vary their level of collection intensity. However, the chapter creates some gray areas in which the GPO can accommodate the concerns of regionals. For example, the GPO permits a regional to serve as a "mini administrative distribution center," whereby the library can funnel some depository items (e.g., maps) to selective depositories serving within its jurisdiction. The regional thereby becomes responsible for depository publications not centrally housed in its collection.

Because regionals need not retain superseded titles, the GPO and the library community have discovered a mechanism for bringing some relief to regionals. The Depository Library Council to the Public Printer is developing a list of superseded titles that ultimately might give regionals more latitude with their deselection decisions.[1] The assumption behind an expanded list is that regionals should not provide archival collections of superseded materials. Such collections, perhaps, should be left to the Library of Congress and the National Archives and Records Administration.

Restructuring the Depository Program

Overview. Any structure should emphasize networking, resource-sharing, dial-up access to library holdings, and the prompt transmission of information not locally held. The structure must address the emerging schism between those depository libraries having technology and those without it. The "have-nots" need some spanning mechanism for gaining access to the resources of the "haves." Technological linkages, including FAX services, can minimize geographical constraints. A key constraint relates to the financial resources available to individual depository libraries. The provision of information in an electronic age is a burden for many depository libraries.

As Reeder (1989, p. 35), of the Office of Management and Budget, has written, "with more and more federal databases available primarily if not exclusively on magnetic or optical media, what structure will fulfill the role of the Federal Depository Library System?" The creation of "mini administrative distribution centers" and other gray area remedies are not an adequate answer to his question.

The literature contains a number of proposals for restructuring the depository program. However, the proposals have generally not confined themselves to the restrictions imposed by Chapter 19. Rather, the proposals have tended to advance models not grounded in existing law. As a consequence, it might be difficult to obtain sufficient congressional, and other, support for their adoption. For a discussion of alternative structures, see Hernon and McClure (1988, Chapter 17) and *Informing the Nation* (Congress. Office of Technology Assessment, 1988).

Interviews. Those interviewed could not envision Congress enacting massive revision of Title 44, Chapter 19. It might be speculated that substantial revision will occur only following years of deliberations. Revision could result from a growing need for *greater cooperation and interdependence among libraries* and a re-examination of the *mechanism and allocation of funding for the depository library program* (including shifts in the role of government versus private sector versus participating libraries).

The advent of electronic services may hasten a restructuring, but it is not the only factor. With electronic services, geographic location may become less of a factor in establishing levels of service, while technological capabilities and subject specialization may increase in importance. In the best of all worlds (and assuming GPO/JCP could administer it without engaging in pork-barrel politics or something worse), the system would benefit if there was more room for innovation in the electronic area, e.g., direct subsidies to a few libraries for providing certain services to other libraries, greater involvement by the private section, more "ad hoc" electronic projects where opportunities exist, etc.

Greater flexibility would benefit agencies like the Bureau of the Census, as well as GPO, depository libraries, and end-users. One other observation -- the possibility of a restructuring of the depository library program is of less importance when considering census materials, because almost every library has a need for such data, unlike other kinds of materials that might be consulted only occasionally.

Nonetheless, some librarians would like the sections governing regionals -- sections 1911 and 1912 -- to be revised.[4] The current structure places much pressure on regionals and selective depository libraries to integrate technologies into their collections and services. If regionals cannot absorb technological applications, what alternative structure is viable?

Some librarians interviewed believe that there is no alternative to regionals serving as the central or administrative component of the program. Furthermore, any revisions that might cost the regionals more money, or give them more responsibilities are unrealistic. Even if the present structure were revised and regionals given new and more responsibilities (e.g., direct use of data tapes), the librarians interviewed suspect that there would be major differences among the regionals in their ability to meet all the responsibilities, unless additional financial support is forthcoming.

The librarians noted that costs (financial and staff time) limit the ability of regionals to handle new demands for electronic data. There is also a belief that the government significantly underestimates the costs of participation in the depository program.

The GPO staff interviewed differ with the librarians regarding regionals. The staff see a change in the role of regionals, in part because of the expectations specified in state plans. (Apparently, GPO staff emphasize these plans more than librarians do.) A few regionals now serve as mini-administrative centers and no longer house all depository publications, e.g., maps. Rather, they coordinate the distribution of publications among different selective depositories. Regionals also serve as consultants and advisors to the libraries serving under their jurisdiction. The availability of more diverse electronic formats through the depository program could force more regionals to become mini-administrative centers, e.g., for magnetic tapes, or to coordinate services with State Data Centers and other information (and data) providers.

It merits note that some librarians interviewed believe that the present structure works fine, especially for census data and publications. They are most interested in access to information. "We'll find ways to disseminate it." Such a belief, however, underscores that the depository program is a confederation of 1,400 libraries, with the strongest networking capability operating within a fixed geographical area, e.g., a state. In this regard, in theory, well-articulated and implemented state plans can advance the depository program by the year 2000, assuming that the goals and objectives specified in these plans are challenging and have certain technological expectations.

National Discussion. Recently, there has been much interest and debate regarding a range of information policy issues. But interestingly, this debate has inadequately focused on the future role of the depository library program. Federal policy makers and interested stakeholder groups must give careful attention to debating these issues and defining a future vision for the depository program.

The discussion and debate of issues related to the depository library program must be done in a setting that allows give and take among the stakeholders, encourage the presentation of innovative perspectives and ideas, and recognize the changes and trends in the Federal and societal information environment.

Recent Legislative Initiatives

H.R. 3695, "Paperwork Reduction and Federal Information Resources Management Act of 1989," advocates the distribution of all government publications, including those in electronic format, to the depository program. On the Senate side, S. 1742, "Federal Information Resources Management Act," calls for the distribution of all publications required by Chapter 19.

H.R. 3849 defines government publications to include those appearing in electronic formats. The bill also advances cost-sharing for depository libraries. The general consensus among depository librarians is that cost-sharing may be a euphemism for cost shifting -- shifting more costs to libraries and their users. Many librarians believe that library budgets cannot absorb a substantial new cost without reducing the ability of libraries to acquire government information resources and make them available.

As this report is written, these three pieces of proposed legislation are undergoing review and revision. Readers may wish to check on the status of these bills on an ongoing basis as it is likely that their contents might change.

STATE DATA CENTERS

The relationship between the Centers and depository libraries is unclear at best and varies from state to state depending on priorities and personalities. The librarians noted limited cooperation and sharing of programs/services between some State Data Centers and the depositories. If more electronic data were distributed to the depositories, then the role of State Data Centers may have to change or be modified. Many depository libraries are not prepared to provide access to magnetic tapes, and this area of services/programs is one especially appropriate for State Data Centers and/or other providers.

Clearly, the structural relationships between State Data Centers and depository libraries require greater attention and clarification. Some librarians interviewed assessed the Centers as useful and effective, some saw them as ineffective, and others considered them as competitors. For additional discussion of the State Data Center Program, see issue area 7.

CENSUS DEPOSITORY LIBRARY PROGRAM

Also related to issues regarding the structure of the GPO depository library program is the existence of the census depository library program. Currently, 130 libraries, predominantly public libraries, participate in the census depository library program and receive a "core collection" of some 150-200 census publications per year. This program has evolved over time in the Bureau and its statutory basis as well as the specific goals of the census depositories are unclear (see Hernon, 1991).

CONCLUSION

There are five major, formalized secondary distributors of census products to users: GPO's sales program, the GPO depository program, the census depository program, the State Data Centers, together with their affiliates, and the private sector. The relationships among these are ambiguous and require additional attention and clarification of responsibilities and services.

To suggest restructuring the depository library program seems to be regarded among some librarians as saying that the program is "bad" and "ineffective," merits "discontinuation," and does not meet is statutory function. It would seem, though, that the proponents of change are not detractors of the program. Rather, they realize the program needs modernization so that it can be take advantage of technology and become a more dynamic and innovative safety net for the future. The proponents of change, however, seem to believe that substantial changes in the program may require revision of Title 44, United States Code, Chapter 19.

SUMMARY ISSUES

- If regionals are to meet more responsibilities, they will need financial support. Who will pay and how much is needed?
- What is the true cost of library participation in the depository library program and the provision of census products and services?
- What are the roles and areas for cooperation between the State Data Centers and the depository library program? How can the relationship between State Data Centers and depository libraries be strengthened?
- Is there a need to conduct costing studies to determine the true costs of participation in the program and the impact from using census data contained in depositories on society?
- To what extent might the private sector or library schools

be contracted to train librarians in the use of census products free-of-charge?

- What specific structural weaknesses exist in the depository library program, and are new statutes needed to repair these weaknesses?
- What structure for the depository library program will best insure that users have access to census data as opposed to census products?
- What is the relationship between the SDC and the regional depository libraries? Which is responsible for what types of services? How can they better cooperate or otherwise be organized to work together more effectively?
- What is the role and responsibilities of the SDC Affiliates program? How do they interface with the depository library program?
- What is the relationship between the census depository libraries and the GPO depository libraries? How can they better cooperate or otherwise be organized to work together more effectively?

NOTES

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1 A Preliminary list appeared in Administrative Notes, 10 (1989), number 9.

2 According to section 1911 depository libraries "shall make Government publications available for the free use of the general public." In states served by a regional, selective depositories may dispose of unwanted publications after retention for five years.

The section complements section 1912 and notes that regionals must retain publications permanently in either print form or microform, "except superseded publications or those issued later in bound form which may be discarded as authorized by the Superintendent of Documents."

Section 1912 permits the establishment of regional depositories and outlines their designation, functions, and responsibilities.

ISSUE AREA SEVEN

Trends in usage of Census Bureau data; will Federal depository library's usage increase, decrease, or remain the same.

BACKGROUND

Apparently, Title 13, *United States Code*, does not contain language directly applicable to the role of the Bureau as a disseminator of data. Section 131 specifies that the Bureau "take, compile, and publish the census of manufacturing," but there is no similar provision covering the census of population and housing. Historically, the Bureau, however, has maintained that "the dissemination of data is implicit in our function because it defies reason that we would collect data and not disseminate it, and Congress has never restricted the Bureau from dissemination" (Rowland, 1990a, p. 1).

IMPORTANCE OF STATISTICAL DATA

Statistical data comprise a significant part of most depository's collection and services.[1] The existence of the *American Statistics Index* (Congressional Information Service, 1973-) underscores the importance of statistical data to libraries and their clientele. Census data comprise a vital resource for depository libraries. Census publications are an important component of the depository library program. Federal depository libraries received 27 percent of all copies of the 10 most important printed documents and microfiche products for the 1980 census from the Government Printing Office (Rowland, 1989, p. 3). Some of the most widely deposited census publications are the *Census of Population*, the *Census of Housing*, the *County & City Data Book*, *Census Catalog and Guide*, *Congressional District Data Book*, and *Historical Statistics of the United States*. The GPO includes all of these sources in the "Basic Collection" for all depository libraries (*Guidelines for the Depository Library System*, 1988, p. 10, Appendix A).

Although the librarians interviewed had not researched the exact number of users, they estimated that 60-80% of depository users need statistical data. Of this percentage range, 75-80% rely on census data. The percentage only provides a rough indicator. The reasons are that users may be unaware of the source of their data and that the Bureau of the Census collects data for other Federal agencies.

USERS OF CENSUS DATA IN DEPOSITORIES

Current users of census data in academic and public library

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depositories cut across all types of users. Some examples of user groups noted by the librarians interviewed include:

- Businesspersons (e.g., small service industries);
- Consultants;
- Extension service personnel;
- Faculty members;
- Genealogists;
- Government planners (e.g., health care and transportation) and other officials;
- Lawyers;
- Local ethnic groups (e.g., Native Americans);
- The media; and
- Students.

Academic and public library users also include neighborhood action groups, volunteer and non-profit groups (with low budgets), and economic development groups. Of course, public libraries serve more students of a wider age range and grade levels. There is an increase in the number of census-related questions asked by younger people. More school projects seem to involve the use of census data.

It should be noted that some groups might not visit the library themselves. Instead they might send messengers or proxies. For example, faculty members might send secretaries or students to get data, and businesses send secretaries and runners to the library. These people might not fully understand what the person wanting the data or information needed and therefore settle for "inferior or incomplete data."

Users of many law libraries may not be engaged currently in substantial statistical research, and may not need frequent access to census publications. Without high user demand, many law libraries do not collect census data. If there is a request for such data, they tend to offer referral and suggest the use of alternate source material. This may change, however, as access to census data becomes more user-friendly.

CENSUS USES

When asked which censuses have the highest priority, the librarians interviewed emphasize both the population and housing, and economic censuses, but there may be variations from community to community. For example, land-grant universities and agribusinesses would need agricultural data, whereas such data might have less value in an inner-city setting. Library clientele use all types of census publications. Succinctly stated, depository libraries want access to as much census data as possible. Perhaps the guiding principle is that "any census data has some use."

Those librarians interviewed do not believe it important that they know the purpose for which someone seeks census data or information. The function of a librarian is to facilitate access to these and to serve as an information dispenser; however, "often we do not know what we dispense." "We do not interpret the data." The consensus is that "we have a 'good handle" on the purposes for which people use census data," but they realize that research might still result in some discovery that has implications for information and data dissemination, and for library services.

At any rate, some of the purposes include: seeking grants, needing access to historical statistics, understanding economic growth and the tax base, investigating affirmative action, planning services, justifying premises, and engaging in a marketing study. The purposes span a host of social, economic, legal, and historical issues.

Users tend to want current data: "The more current the better." Herein is a problem with decennial census data; it becomes dated too rapidly and library users become dissatisfied. Thus, there is much interest in using electronic dissemination techniques to improve the timeliness of the data. Libraries continue to collect more statistical data to answer a wider range of questions requiring access to the latest data available.

When bibliographic records for census publications are included in on-line central library catalogs use (including circulation) of these publications increases dramatically. Students, however, assume that on-line systems contain all library holdings. On-line systems may enable users to obtain information, and data, without having to seek staff assistance. When users conduct independent searches, they might miss data or fail to identify "better" data. Still, they seem satisfied with what they find. The same applies to use of some private sector produced CD-ROM containing limited statistical data. Users get the impression of "that's all there is."

Those interviewed believe that type of depository library is not an important variable for predicting use, whereas size of library is important.

The librarians interviewed believe that usage of census data has increased, perhaps significantly so. Undoubtedly, use will continue to increase as current barriers and constraints to utilizing data are eliminated. Technological improvements, more user friendly software, etc. will directly impact use. People want current information. Some census publications, including a decennial census, become outdated quickly. Depository libraries expand their collections of census data so that they can answer more questions, with the most current data possible. The librarians would like the Bureau to release data in paper form for permanent retention more quickly.

As people manipulate datasets, they create new uses of census data. Clearly, as the Bureau releases more data to libraries in CD-ROM format, the libraries expand the types of census data within their immediate collection. This enables libraries to better serve their clientele: they provide more data and users will think up new uses.

More attention needs to be given to developing technologies and services to access specific information contained within the various electronic formats, rather than just using the technology to increase the amount of data that can be stored in a particular medium.

The librarians agreed that a key issue related to the use of census data will be training and educating both users and depository librarians on how to best access specific data within the various census products. They saw the Bureau of the Census as having increased responsibilities for such training as its products become more technically sophisticated. Moreover, both the Bureau and the private sector need to develop end user products that are user friendly.

The new information technologies may increase significantly the use of census data because there will be greater access points and CD-ROM prices are likely to continue to decrease. In addition, new technologies such as e-mail and telefacsimile allow remote reference service provision that may also increase use.

The GPO staff interviewed also underscored the importance of training and noted that depository librarians are dedicated, hard working people who often cannot meet all of the service demands placed on them. Users must have opportunities for self-learning. Computer-assisted instruction, and non-technical instructional booklets, might be beneficial. In addition, CD-ROM products might contain instructional files that include study questions.

GPO staff have high expectations for the TIGER system and the maps that the Bureau might produce and provide to depository libraries. The TIGER extracts may create additional users and uses of census data. Evidently, both the librarians and GPO staff regard census data as critical to the collection of depository libraries. New uses of the data only make census data even more vital to depository libraries and their users.

Census products are designed to meet a variety of information needs for different segments of the population, including those in government, academic researchers, students, nonprofit organizations, the media, business and marketing groups, associations, labor unions, religious organizations, private organizations, and the general public. In fact, there is "an increasing appetite for statistics" (Argana, 1989).

DIFFICULTIES

The initial tendency is to forecast increased depository library use of census data. This is because, with the advent of CD-ROM technology, depositories will probably have access to vast amounts of data not previously available to them on-site.

The other side of this issue, however, is that this same data will also be directly available to more end users. Because of convenience, affordability, and space-saving format, more individuals may elect to purchase their own materials rather than rely on libraries.

One of the difficulties in addressing this issue is the lack of certainty of the technological capabilities in the year 2000 and beyond. If cheap, mass produced, and easily retrievable data are available directly to the public, the function of the Federal depository library as a source of the material may diminish. On the other hand, the librarian's role as an educator and technical advisor in the use of the data may increase. Librarians, after all, are "in the business of learning and teaching information literacy" (Breivik and Gee, 1989, p. 12). "Information-literate people know how to find, evaluate, and use information effectively to solve a particular problem or make a decision" (Ibid., p. 13). The information explosion mandates "a redefinition of literacy that includes information skills" (Ibid.).

According to one librarian (Herman, 1990),

> Usage of census publications in libraries depends upon many factors. Most important, staff must recognize the value of the data, and must recognize that they must do much more than merely hand statistics to patrons. Staff must also be able to assist patrons in locating specific data, in interpreting the data, and in using equipment. The library administration must support use of census data. The best staff in the world can do little to assist users if administrators fail to recognize the value of the service.

BUREAU OF THE CENSUS

The Bureau has an organizational structure for supplying the public with access to census data. The structure includes the Bureau itself -- the facilities in Washington D.C. and the regional offices, State Data Centers, Business and Industry Data

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Centers, National Services Information Center Program, and depository libraries. The libraries might be part of either the census or Government Printing Office depository programs. At the same time, the private sector repackages census products for its customers and also distributes census data through its on-line services.

Use of census products is not unrelated to this structure, the manner in which the various components interact, the responsibilities of each group, and the ease with which the user can navigate this structure. The Bureau of the Census may wish to reexamine, in part, its structure for supplying the public with access to census data and consider specifically how this structure affects access and use.

THE STATE DATA CENTER PROGRAM[2]

An important component of access to Bureau of the Census data is the State Data Center Program. This system was created administratively by the Bureau in 1978 to improve access to census and other Federal statistical data. The system consists of a network of approximately 1,600 participating agencies in each of the 50 states, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

Much of the focus of the State Data Center program has been on the enormous amount of data generated by the 1980 Census of Population and Housing. The Bureau of the Census estimates that the printed reports alone, if put into a single pile, would equal a 15-story building. Even this formidable stack of paper represents only about 10 percent of the data collected in the census. The more comprehensive computer tapes would reach 800 miles, while map and microfiche sheets number in the tens of thousands.

In addition to decennial census data, State Data Centers assist with access to and use of other Federal statistical data. This includes population estimates and projections, income, poverty, housing, and related materials. A recent (February 1988) expansion of State Data Center roles is the Business/ Industry Data Center (BIDC) initiative which focuses on improving access to economic data. Fifteen states are participating in a pilot project in which they "receive economic data and related assistance and training from the Census Bureau and other Federal agencies to aid in furthering economic development" (Census Catalog & Guide, 1989). Some of the BIDC lead agencies are also State Data Centers. The Bureau of the Census expects more states to join the BIDC program and would like to have 100% participation in the future.

Under the terms of the State Data Center Program, each participating state enters into a joint Statistical Agreement signed by its Governor and by the Director of the Census Bureau. An annual work plan outlines specific resources to be provided and activities to be undertaken by the Bureau and the State Data Center. Project coordinators in the Bureau and the Center lead agency sign this plan.

Details of program structure vary from state to state, but all have the following three components:

- A Lead Agency at the top of the hierarchy. This is the entity that the state designates as the official contact point with the Bureau. Most lead agencies are executive departments, but in some states libraries or universities fill this function. Lead agencies create and administer a state network, communicate with their members, and act as a liaison to the Bureau. They also answer and refer requests for data

- One or more Coordinating Agency(ies) in the second level of the program. This level typically includes executive agencies, universities, and libraries. In addition to answering and referring requests for data, coordinating agencies often have specifically defined functions or specialties, e.g., representing the state university system, acting as a liaison to the library community, or serving state government. There are approximately 200 coordinating agencies in the program

- Affiliates at the base of the pyramid. In response to varying organizational structures within the states, affiliates include regional/local planning commissions, public and academic libraries, universities, state agencies, and chambers of commerce. These are often the first point of contact for users seeking data, and they answer or refer requests for data. All have a "core" collection of printed census publications for their state; some have access to electronic equipment (tape processing facilities, microcomputers, and CD-ROM players) and produce their own printouts and publications. There are now about 1,400 affiliates in the program.

The Bureau of the Census provides free copies of all printed reports, computer tapes, and microfiche covering a state to the lead agency, and makes a sufficient quantity of 1980 census and other publications available for distribution to affiliates without charge. In addition, the Bureau allots each State Data Center a quota of free material for other states from which it can select to supplement its own state's resources. The Bureau also provides staff support, training, and technical assistance; and administers an electronic bulletin board for the State Data Center Program (see question 5).

Services

Reference Assistance. Information needs range from a single statistic in a printed report to a customized tape run for a major project. Staff of State Data Centers, who are knowledgeable about the vast array of unpublished census data, consult with potential clients and provide referrals to other sources when appropriate. Typical client groups include businesses, government agencies, and researchers. Nationally, State Data Centers respond to over 500,000 requests annually.

Information Products. State Data Centers produce printed materials, microforms, and computer printouts. Information products are often generated at the state (lead or coordinating agency) level, and less frequently by affiliates.

The most common publications from a lead agency are newsletters, which provide information about the lead and coordinating agencies, affiliate publications, training opportunities, and Bureau activities. Some newsletters reprint Federal data, e.g., annual population and per capita income estimates for areas receiving Federal revenue sharing funds.

State Data Centers also generate data not found in printed reports (e.g., data for small areas, school districts, and zip codes) as well as compilations of statistics from printed sources rearranged for easier access.

Training/Outreach. Another way of improving access to census data is through education. State Data Center personnel work with business and civic groups, libraries, academic institutions, etc. They provide both general information on the census and training in the use of specific products.

Decennial Census Planning and Census Bureau Cooperative Work. State Data Centers have been working with the Bureau to plan for the 1990 census by acting as a communication channel from the states to the Bureau. State Data Centers co-sponsor local public meetings with their regional Bureau of the Census offices to elicit public comment on the content, format, and products of the 1990 census.

State Data Centers have been working with local government officials to ensure complete counts, have coordinated activities related to delineation of census statistical areas (e.g., tracts, block numbering areas, and census designated places), and have helped with local review activities. They have also worked at publicizing the 1990 census within their states.

Other Functions. Other activities of State Data Centers vary from state to state. Many participate in the Federal-State Cooperative Program for Local Population Estimates. The objective of this program is to develop and publish annual population estimates for counties using uniform standardized procedures for data input and methodology. In participating states, the Governor designates an agency to work with the Bureau on the project. That agency and the Bureau then jointly select the methods used to prepare the estimates (see Bureau of the Census, 1973).

Some State Data Centers produce statistical abstracts or create automated databases. A few act as a general statistical coordinator in their states. Examples of statistical coordination responsibility include reviewing state attempts to capture new data series, consolidating data collection forms, and preparing guidelines for model statistical studies and publications.

A number of State Data Centers maintain electronic bulletin boards for affiliate and/or public use. These typically include textual and data files for printing and/or downloading, as well as electronic mail capability.

The Role of Libraries in the State Data Center Program

Libraries are members of the State Data Center network at all three levels. In Indiana, Kansas, and Nebraska, the lead agency is the State Library.[3] In another 36 states, plus Puerto Rico, libraries function as coordinating agencies. At the affiliate level, there are about 400 public and university libraries.

Because of population-based limits on the number of affiliates which a state may name, all libraries cannot be designated as formal members of the affiliate network. In some states, Federal document depository libraries are invited to become "depository affiliates." The Bureau does not send them the census publications that it supplies to formal affiliates, but the State Data Center does keep the libraries informed of its activities and services through mailings and other publicity. Similar arrangements are made with non-depository public and academic libraries in some states. Another means of library involvement is through the designation of a major library (usually a state or university), which, in turn, communicates with the library community about State Data Center activities and products.

Library/State Data Center Interactions. Libraries (depository and other) may interact with State Data Centers on many levels. Some of these ways include:

- o Reference Assistance. Libraries and State Data Centers both collect census data, and refer clients back and forth as appropriate;
- o Publication Collection and Dissemination. Libraries are interested in publications and other information products

generated by State Data Centers. Ideally, State Data Centers distribute their newsletters and other publications to libraries within their area. In some cases, libraries and State Data Centers have collaborated in issuing special collections of 1980 census data (e.g., microfiche of data elements from Summary Tape Files 1 and 3) for distribution to libraries and other constituents;

- ○ Training/Outreach. State Data Centers and libraries have cooperated in offering training sessions on census and other Federal statistical resources. In some states, special training classes have been targeted to library audiences. The affiliate meetings and training sessions in which libraries participate are another source of current information. Libraries have been involved in preparations for the 1990 census by co-sponsoring local public meetings, communicating their need for data items to the Bureau, and publicizing the census among library clientele;

- ○ Other Projects. Some of these special projects include creation of and access to on-line systems, directories of area collections to facilitate referral, and technical assistance with hardware and software selection. In New York, the State Data Center has invited all libraries to sign onto its electronic bulletin board at no cost except for telephone charges. This system puts its users in touch with about 150 members of the State Data Center and library, academic, and private sector communities, and provides access to text and data files frequently unavailable in print. As a special service, the State Data Center has set up a Library Conference on the electronic bulletin board to facilitate interlibrary communication. Thirty-five libraries now participate in the conference; and

- ○ Organizational relationships. The American Library Association's Government Documents Round Table (ALA/GODORT) has had a liaison relationship with the State Data Center Steering Committee. The liaison has been responsible for attending GODORT and State Data Center meetings, and for reporting to each on the activities of the other. The Bureau also sends a representative to GODORT meetings to maintain a channel of communication with the library community.

ALA/GODORT also created a survey form with questions on program structure, services, publicity, and library-State Data Center relationships. The survey was endorsed by the Bureau and the State Data Center Steering Committee, and sent to State Data Centers and a sampling of libraries nationwide. The results are expected to be tabulated, analyzed, and made available in 1990.

Problems

Despite the existence of some very good models, such as those discussed above, on the whole, Federal depository libraries and State Data Centers have far to go in working together to ensure maximum effectiveness of public access to census data. Some of the underlying causes of this include:

- Mutual lack of awareness and communication about each other's services and products;
- The different ways in which State Data Center personnel and librarians sometimes perceive data. State Data Center staff are typically demographers, planners, or electronic data processing experts and may not think of libraries as the sources of the data they need. On the other hand, librarians have historically been print oriented and are not always aware of the details of electronic access;
- The need, at least in some states, for the State Data Center program to be financially self supporting. It may therefore be impossible for the State Data Center to share its data without charge even if it wishes to do so; and
- Varying service policies and staff turnover in State Data Centers that make contact difficult.

The Future of the State Data Center Program

As depository libraries and State Data Centers have direct access to more of the same resources, they should find more common ground in future cooperative projects. To the extent that State Data Center personnel are knowledgeable about the new technologies and effective ways of using them, they can be approached to share their expertise with the library and end-user communities. However, a carefully crafted strategic plan is needed to better coordinate depository libraries and State Data Centers.

Recommendations for Strengthening State Data Center/Depository Library Relationships

Although there are some good models of cooperation between State Data Centers and depository libraries around the nation, the programs operate independently and without adequate formal contact. Too often the existence of cooperative projects within the states depends on the interest and good will of individuals rather than on the inherent program structure. Although organizational structure cannot by itself guarantee a successful program, the structure should be designed to allow and facilitate cooperation.

In order for State Data Centers and libraries to work together effectively, there must be formal structures strengthened by individual commitment at every level of the programs. This includes the national (i.e., Bureau of the Census and the GPO), state (i.e., State Data Center lead and coordinating agencies, state library agencies, and regional depository libraries), and local (State Data Center affiliates and depository libraries) levels.

The following recommendations attempt to address structure, governance, and relationships of the State Data Center and depository library programs. The recommendations have been made with the goal of linking the two programs effectively in order to improve public access to census data. The ideal outcome would be two cooperative programs, each knowledgeable about the other's capabilities and referring clients to other program as necessary to meet information needs.

National Level:

- The Depository Library Council to the Public Printer should have one slot allocated for a representative of the State Data Center Steering Committee. This member would be designated from Steering Committee members (discussed below);

- The GPO should continue its work with the Bureau of the Census to incorporate census information products, both print and electronic, into the depository library program. Some Bureau publications are not currently depository items but contain valuable information of interest to depositories;

- The GPO should regularly publicize the State Data Center program through Administrative Notes;

- The GPO and the Bureau of the Census should investigate the possibility of a formal link between the two programs. Most depository libraries receive census publications through the GPO even if they are not formal affiliates of their State Data Centers. Can depository libraries that receive census publications from the GPO be given some sort of status in the State Data Center program? Perhaps they could be designated as Federal depository library affiliates. They would continue to get what they always got (at no further charge to the Bureau of the Census) but would have formal status in the State Data Center program;

- At the request of the GPO, the State Data Center Steering Committee should assign one of its members to be a full member of the Depository Library Council to the Public Printer. State Data Center Steering Committee members are elected by vote of State Data Centers. Having one of the members on the Depository Library Council would facilitate communication between the two programs;

- The State Data Center Steering Committee should create a subcommittee or study group to work on State Data Center/depository library relationships. This group could be chaired by the designated State Data Center Steering Committee member of the Depository Library Council;
- The Bureau of the Census should, in the Joint Statistical Agreement that is signed with each state, specify the depository library community as one component of the State Data Center coordinating agency network in each state. Within the framework of differing depository/State Data Center structures, the Bureau of the Census should require State Data Center lead agencies to designate a library or libraries as a coordinating agency and specify expectations (e..g., acting as a communication link to the depository library community in the state);
- The Bureau of the Census should invite depository libraries participating in the State Data Center program to contribute items for the State Data Center Steering Committee Newsletter (although it seems to have been a while since an issue has been published) and the Business/Industry Data Center (BIDC) Report;
- The Bureau of the Census and the GPO should make a concerted effort to publicize and (at least occasionally) jointly schedule their fall meetings. These both take place in Washington, D.C., usually in October. While the agenda for both meetings are very full, some joint sessions may be able to be arranged. If each agency publicizes the meeting of the other group in such vehicles as Administrative Notes and Census and You, as well as direct mailings to key communication links, more participants would be aware of both meetings;
- The Bureau of the Census and the GPO should investigate the possibility of designing special training sessions, with emphasis on new formats and technologies, for the depository library community. This could be done in cooperation with other interested groups, including the American Library Association's Government Documents Round Table. These sessions could be given as a pre-conference of the Depository Library Council. The courses should also be designed to be portable so they could be presented in other locations throughout the nation with the cooperation of the area State Data Centers and the depository libraries;
- In a related training project, the Bureau and the GPO should also cooperate in the design of training courses stressing depository library collections and expertise. The course(s) could be part of the State Data Center annual meeting and

be adapted for presentation in the individual states with the participation of the library community and the State Data Centers;

- The Bureau of the Census should make a concerted effort to publicize the State Data Center electronic bulletin board and other similar tools to the depository library community. There seems to be confusion over access to the board. Apparently, access has opened up on one line but there does not seem to have been an organized effort to publicize and promote the board. This could be done through Administrative Notes, program(s) at the Depository Library Council, or in a special training sessions mentioned above; and

- Because cooperation at every level is essential for improved State Data Center/library relationships, the Bureau and the GPO should actively encourage their members at the state and local levels to formalize relationships and work cooperatively. Although outside the scope of these recommendations, some suggested ways are listed below.

State/Local Level. Among suggestions for strengthening State Data Center/depository library relationships which the Bureau of the Census and the GPO could encourage at the state/local level are membership of depository library representatives on State Data Center advisory councils and/or steering committees, membership of State Data Center representatives on Federal Depository Library Service Advisory Councils at the state level, revision of state plans for depository library service to strengthen depository library/State Data Center relationships, joint training sessions, and cross publicity in State Data Center and library publications.

INCREASED COOPERATION BETWEEN THE BUREAU AND DEPOSITORY PROGRAM

Some of the librarians interviewed would appreciate a more active partnership with the Bureau, perhaps modeled after the liaison program developed by the National Technical Information Service. Prior to the time to conduct the next decennial census, they would like to receive promotional material announcing census taking and highlighting the importance of participation. A benefit of cooperation is that more members of the public would realize that depository libraries receive census material and make it publicly accessible.

TRAINING

Increased usage of census products, especially those produced in electronic form, requires training of library staff and end-users. Such training should not be limited to use of products, but also cover data collection and statistical analysis techniques.

The Data Users Services Division (DUSD) has primary responsibility for marketing, training, and promotion of census services and products. DUSD activities focus around:

- National Exhibits Program: visit some 250 shows per year with an exhibit, handouts, and possibly some computer demonstrations;
- Training: about 12 individuals from DUSD and approximately 50 others from the Regional Offices do various types of training as a support service to other branches of the Bureau. Training is targeted at various user groups and there is a training session targeted at librarians; and
- Instructional Materials Design: staff design instructional materials and promotional matter.

The more effective these training and promotion activities, the greater the likely use of census data through the depository libraries.

The Bureau might expand the number of professional staff responsible for census training. While the regional offices do provide some census training, clearly, there may be a significant incongruity between the budgeted support for training versus production.

If the basic viewpoint at the Bureau is to collect data and "get them out the door," this viewpoint merits reexamination, with more attention given to training and promotion. With an estimated cost of $2.6 billion for the conduct of the 1990 census, a large percentage of that expense ought to be dedicated to increasing the amount of use and impact of census data.

More depository libraries are making a greater commitment to obtaining census CD-ROM, bulletin boards, and other electronic products. Consequently, they need more direct assistance from the Bureau so that they can continue to provide effective service to available and planned products and to meeting the evolving information needs of their clientele.

SELF-TRAINING PRODUCTS

Use of census data will be affected by the degree to which census products can be used easily and effectively accessed by users without professional guidance and training. A number of Bureau services and products can include self-instructional modules so that users can train themselves. While some efforts have been directed to this topic, much remains to be done.

COST-SHARING

Use of census materials could also be affected by cost-sharing efforts on the part of the government (see Bates Bill, H.R. 3849, 1990):

> **Such an agreement must describe the terms and conditions of access, including arrangements for cost sharing, such as contributions from service users, depository libraries, the issuing component of Government, and appropriations for the depository library program.**

If such proposals for cost-sharing are enacted into law, there might be significant repercussions in terms of access to and use of census material. Severe budgetary pressures on both government agencies (such as the Bureau of the Census) and depository libraries impact cost-sharing.

With the depository program serving more than 167,000 users per week (see McClure and Hernon, 1989) and member libraries already absorbing staffing, building costs, and equipment, how many more costs can these libraries assume?

Libraries may have to pass costs along to users. Many administrators, for example, are concerned about the costs of inkjet cartridges and paper, for both CD-ROM and on-line catalog use. These costs may be both substantial and unpredictable from year to year. If libraries must recover costs for inkjet printers or computer paper, what will be the impact on use?

RELATIONSHIP WITH THE GPO

There is considerable confusion among those librarians interviewed as to whether or not they should obtain "publications" and other products from the GPO, the National Technical Information Service, or the Bureau of the Census. Thus, use of census material may be injured because of this confusion and the inability of users to deal with the procedures for obtaining census material. In addition, the GPO receives the moneys generated from the sale of census publications. Thus, there is limited financial incentive for the Bureau to promote the sale and distribution of census material distributed through the GPO. Paradoxically, the Bureau wants to increase use of census materials but receives no financial reward for doing so.

The Bureau cannot distribute publications through the GPO sales program unless the GPO determines that these publications will sell well within a relatively short time frame. This situation raises the question of the degree to which census material could be better distributed through general bookstores throughout the country. This issue is complex and has many facets. One of these pertains to the discount that the GPO can extend according to Title 44, United States Code.

Users want to gain access to census products "immediately" upon their availability. A number of librarians interviewed believe that having to wait a long time for the Bureau to supply material (the product, documentation, etc.) to the GPO for depository distribution may be unacceptable. In such instances, they suggested, use of census materials through the depository library program could decrease in the future.

Increasingly, datasets being made available for downloading via electronic bulletin boards may shift the use of census materials away from depository libraries -- especially since the information content can be obtained so much more quickly through electronic means.

MAP DISSEMINATION AND USE

There is no requirement that a full range of 1990 census maps be distributed or otherwise made available to the depository library program in paper copy. The real problem is the block statistics maps electrostatically produced. These maps will be illegible, or nearly so, in microfiche. If the Bureau sells block maps in other than microfiche (i.e., paper or CD-ROM), depository libraries must be prepared to purchase these maps. Will the GPO sales program pick up some of these maps? If so, which ones and will the map products be offered to depository libraries gratis.

Interestingly, there is a perception among some librarians interviewed that it is the primary responsibility of DUSD to provide effective dissemination and training in the use of map products. Again the differences between the "production" and "dissemination" viewpoints within the Bureau of the Census is significant.

THE LIBRARIAN AS INTERMEDIARY

The depository librarian's role as intermediary between Bureau services and products may lessen over time, for the reasons discussed above. If the depository librarian cannot serve as an effective intermediary it is unclear if alternative intermediaries will be located by the user, if the private sector will fill the gap, or if new structures such as a county extension agency model will be developed by the Bureau.

Rowland (1989) discussed some of these issues at length. The effectiveness of the depository librarian as intermediary in an electronic age of census data is a key issue. The effectiveness of depository librarians as intermediaries has significant impact on overall use of census products and services. While there is no existing baseline data on use of census products and services in depository libraries, it clearly is in the best interests of the Bureau of the Census to enhance the effectiveness of depository librarians as an intermediary.

VALUE-ADDED SERVICES AND PRODUCTS

Use of Bureau services and products will also depend on the number, type, and effectiveness of various value-added services and products provided for basic census products and services. In the area of CD-ROM, for example, the Bureau will need to add on-screen help menus and user manuals (rather than only produce paper copy manuals), and technical support for loading and using the electronic information products will be essential.

It is important to determine the point at which the private sector, not the Bureau, should provide value-added services and products for census materials. Census staff believe that there is a large secondary market for Bureau products and services. The development of TIGER may be a model approach to involve the private sector in the design of value-added services. Attention should be given to comparing the costs of libraries (nondepository and depository libraries needing additional copies) obtaining publications from private sector agencies, such as Bernan Associates, versus purchasing them directly from the GPO.

Compounding the complexity of issues related to the provision of value-added services and products for census material is the current effort of the GPO to "Identify opportunities for dissemination of Federal agency-derived information products and services in electronic formats which could be made available to depository libraries through non-government channels" (Administrative Notes, 11 [January 15, 1990, p. 1]). This issue may affect both use of census materials as well as the structure of the depository library program (issue area 6).

ANNOUNCEMENT/PROMOTION OF CENSUS SERVICES AND PRODUCTS

Use is also affected by the effectiveness with which the Bureau announces and promotes products and services. Four key sources announce Census services and products:

- Census and You;
- Monthly Product Announcements;
- Bureau of the Census Catalog; and
- Press releases from the Public Information Office.

Increasingly, products and services are also being announced through CENDATA and the SDC Bulletin Board. However, it is unclear how effective these announcement techniques are for specific target audiences. The Bureau of the Census should carefully evaluate the effectiveness of these announcement techniques and consider the use of supplementary techniques as needed.

TRENDS

Improvements in technology and in software applications will make access to statistical data easier for the layperson as well as create more opportunities for experts to manipulate datasets. The result will be heavier use of census data, provided depository libraries are in a position to take advantage of these improvements and applications. Widespread mainstreaming of document records into library catalogs (or other access systems) and the development and implementation of expert systems will lead users to resources, including census data, they need but might otherwise have overlooked. If depository libraries can gain free or low-cost access to census data in additional formats -- on-line services such as CENDATA, for instance -- use is likely to diversify as well as increase. New data delivery systems, including access via modem, telefacsimile, or high-speed laser printers from libraries to distant homes and offices will also broaden the depository library audience for census data.

Another trend is increased involvement of commercial interests in the provision of census data to the general public. As Level I data become available more quickly and cheaply and in easily manipulable formats, it will become easier for private firms to recombine and sell census data in packages tailored to popular local interests. Depository libraries, in certain instances, offer access to census data that were not acquired through the depository program; they obtained the source material from either the Bureau of the Census or commercial sources. This trend will likely become more prevalent.[4]

If depository libraries are to be successful competitors in the "battle" to provide the public with increased access to Bureau data, they must be able to acquire Level I data in machine-readable format free or at very low cost through the depository program. Since most depositories are not equipped to handle data on magnetic tape, this means, for the near future at least, that libraries must be offered all products the Bureau converts or plans to convert to compact disk format. Additionally, the Bureau and the GPO must coordinate their dissemination efforts well enough so that depository libraries receive new CD-ROM products soon after they are released.

Unfortunately, such is not now the case and this does not bode well for the future. Depository libraries were slow to receive the 1988 County and City Data Book, and still have not received any of the 1987 economic census data released on CD-ROM. And, although the Bureau's Foreign Trade Statistics series are not being released on monthly compact disks, there has been no word from either the Bureau of the GPO as to whether these will be made available on deposit. Currently, depository libraries are receiving the microfiche versions of these reports, which do not contain as much data as the disks and whose distribution has been massively disrupted by the microfiche contractor problems that the GPO has encountered over the past several years. The prices established for subscriptions to the monthly foreign trade CD-ROMs (one series for import data and one for export data) total $2,400 per year. This is clearly beyond the reach of all but the very largest and best-funded depository libraries.

SUMMARY ISSUES

- What can the Bureau do to improve the timeliness of its release of data products?

- Should the Bureau provide products and services that enable users to manipulate data sets easier and more accurately, or is this the role of the private sector?

- What are the responsibilities among the GPO, depository library program, State Data Centers, and the Bureau of the Census regarding training library users and staff in dealing with census products and services?

- What self-learning opportunities are there (and will there be)?

- Will technology be developed to the point where minimal training is necessary?

- What is the relationship between the public and private sectors, and the role of each in the provision of census products?

- What are the most significant census titles, ones that should remain in all depositories?

- How can the Bureau enhance downloading capabilities to ensure greater individual uses of census data?

- Is it a correct assumption that, by 2000, there will be consistency -- standardization, among CD-ROM products?

- The Bureau emphasizes production of data rather than dissemination and improving the use of those data. How can the Bureau provide greater support to DUSD efforts and specifically, what type of support should be provided?

- How can self-instructional components be added to the various census products to increase understanding and use of that product?

- How effective are the existing announcement techniques for informing depository librarians about census materials? To what degree do users respond to these announcements by using depository libraries to gain access to the announced census materials?

- To what degree might cost-sharing efforts between the government and depository libraries affect access to and use of census materials?

- How many depository libraries wish to receive census map products? Which products do they want to receive? Do they have the resources to organize and make these maps accessible?

- To what degree does publication/distribution by both GPO and the Bureau of the Census of selected materials injure access to and use of census materials?

- Are there "profit sharing" approaches by which some of the proceeds from the sale of census material through the GPO could revert to the Bureau of the Census? Should the Bureau become a consigned agent for the GPO and sell printed publications?

- How can the Bureau better exploit the distribution of census products through the GPO sales program?

- How can the production and distribution of census products be made more efficient so that these products are delivered to depository libraries in a timely fashion?

- How effective will the depository librarian be in an electronic information age in providing access to census data?

- What value-added services and products are necessary to provide adequate access to census materials?

- What steps should be taken to insure that such value-added services and products are provided?

- What criteria should guide the determination of which value-added services and products should be developed by the private sector rather than the Census Bureau?

- How would dissemination of census electronic data through non-government channels affect overall access to and use of census products?

- CD-ROM might contain multiple "publications." Will users realize this and negotiate the relevant databases? How will libraries catalog such CD-ROM products and make them available and accessible? Where users rely on on-line catalogs, are libraries limiting access to the holdings, when such products are not represented in on-line catalogs?

NOTE

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1 Because users of many law libraries may not be engaged in statistical research, they may not need access to census publications. Without high user demand, law librarians would not collect census data. Rather, if there was a request for such data, they would either offer referral or suggest the use of alternative source material.

2 See also Redmond (1987).

3 The Missouri State Library also served as a lead agency until the fall of 1985.

4 The Bureau's own Neighborhood Statistics Program reports and CACI's products that contain 1990 census data by zip code are examples of this phenomenon.

ISSUE AREA EIGHT

Feasibility of more research in the user/use patterns of Census Bureau data in the Federal depository libraries, with emphasis on the possibilities for studying the users and use of information from the 1990 census.

Many of the topical areas discussed below are not unique to census products and services. Rather, they are indicative of access problems involving government publications and information in general. Of course, at this time, current efforts within the Bureau of the Census focus on the collection of the 1990 census and production of data products from that census. Perhaps, within the near future, divisions within the Bureau can evaluate the decennial census data products and begin planning for the year 2000.

MARKET RESEARCH ON USE AND USERS

There is inadequate knowledge about the users and uses that they make of census data via the depository library program. Limited analysis of who receives what type of data services and products has been done, nor have cross tabulations between and among users and uses of the various censuses been conducted.

COST-BENEFIT ANALYSIS AMONG DIFFERENT FORMATS

The Bureau should consider costs, benefits, and limitations of electronic dissemination in light of the effectiveness with which users can acquire and use census products. Investigations of use, access, cost, effectiveness, etc., could be studied by issuing products in two or more formats and making direct comparisons.

ROLE OF THE CENSUS DEPOSITORY LIBRARY PROGRAM

What are the mission, goals, and objectives of this program? Does the program complement the GPO's depository program? If so, how? Should the census program exist? If yes, what is its appropriate role? How effective are census depository libraries as disseminators of census products? What does it cost the Bureau to operate this program? Are the costs worth the benefits?

VALUE-ADDED SERVICES AND PRODUCTS

What responsibility does the Bureau of the Census have for providing value-added services and products? How can the Bureau better work with the private sector in designing value-added services and products? What specific value-added services and products do users want and prefer?

RELATIONSHIP BETWEEN THE GPO DEPOSITORY LIBRARIES AND STATE DATA CENTERS

Which agency is responsible for what types of services and how can both better cooperate to improve access to census data? How effective has the State Data Center program been in meeting specific dissemination objectives as compared to the depository program? How are these roles likely to evolve in the future?

There is a need for further research into responsibilities, clientele, needs, etc., of depository libraries as compared to State Data Centers. Research might also examine the need for and possible content of programs to strengthen the relationships between the depository libraries and State Data Centers.

DISCONTINUITIES IN USE OF CENSUS PRODUCTS AMONG DEPOSITORY LIBRARIES

While there is much speculation about what depositories might request what types of census products in the future, little data have actually been collected. Predictions of use of census products in the depository library program are likely to vary minimally in terms of:

- Type of depository;
- Size of host institution;
- Setting (urban, suburban, or rural location); and
- Library mission, goals, and collection development objectives.

In short, there is no typical depository library, but rather a broad range of depository situations and contexts. Models need to link types of census use patterns with types of depository libraries.

SUCCESS OF THE 1990 DECENNIAL CENSUS

The Bureau could develop a research program to assess the effectiveness and use of 1990 products disseminated through the depository program. Many of the issues identified in this report lend themselves to formal investigation and research designs that incorporate a "before, during, and after" approach. Findings from such an approach would be critical for designing future census services and products.

USER FEES

The discussions of user fees suggests that depository libraries, with cooperation from Congress, must more fully explore the issue. To what degree are different stakeholders willing and able to pay for specific types of census products?

USERS OF CENSUS PRODUCTS IN DEPOSITORIES

It would be important to know who uses census publications in libraries and what percentage census users are of all the documents users.

The research apparently might focus on accessibility of data -- cost, format, timeliness of receipt in libraries, and extent of manipulation. Library users need to know what to expect in depository collections, and the libraries need to plan collections that meet short and long term needs.

Research might also examine the importance of on-line catalogs as a link to increased use of census data.

COST OF DEPOSITORY PROGRAM

According to the librarians interviewed, there should be a study of the "true" costs of participation in the depository program and providing access to census materials. Such a study, one going beyond that reported in Mawdsley (1990), might convince the Federal government to commit additional resources to help depository libraries cope with the demands placed on their collections and services.

USER EDUCATION AND TRAINING

There should be ongoing efforts to design, develop, use, and evaluate a range of education and training manuals to relieve depository libraries of some of the burden of training staff.

SUMMARY AND CONCLUSIONS

Over the years, the Bureau of the Census has collected and organized significant amounts of data over broader areas in an efficient manner. More data can now be readily manipulated, without library users needing access to magnetic tapes. However, the effectiveness with which data are disseminated to various user groups may not have increased.

There is pressure on Census staff to do the 1990 census well and it may be difficult for them to consider issues and problems for future census activities at this time. The view that future census activities and products depend on the results of 1990 census-taking was evident in a number of the interviews. Thus, the success with which the 1990 census is completed may have a significant impact on future census products and dissemination activities.

Technological capabilities are making improved access to census data available to a wider spectrum of users and uses. Depository libraries have both the opportunity and the challenge to ensure that they continue to play a vital role in providing the public with access to census data. The following general recommendations seek to address the situation:

- Federal depository libraries should take a proactive role in absorbing new technologies. Some already do this very well, but many do not. It is interesting to compare librarians' perceptions of how they are coping with those of Census Bureau staff members. According to the latter, librarians "have not been able to stay abreast of new technologies" and have "a significant learning curve to address regarding these new technologies.

  If the situation is indeed this dismal, more communication is needed from the Bureau about technological requirements (hardware, software, and training) so that librarians have a clear idea of needs and can plan effectively to meet these needs.

- Federal depository librarians should act cooperatively on plans for access to data contained in electronic formats. In the early 1980s, there was a movement to develop statewide plans of Federal depository library service. The time has come to study the specific issue of electronic access, either as supplements to the original plans or as entirely new documents.

  Among the issues that could be addressed in the plans are identification of anticipated needs, alternative modes of access (it is unlikely that all Federal depository libraries will be able to support a full range of electronic services), cooperative purchasing of hardware/software, and referral mechanisms for optimum information sharing.

- Federal depository librarians should examine their role in the information provision process, and be prepared to deal with questions involving interpretation, data manipulation, and equipment maintenance. These involve a broadening role for librarians, and not all staff members may be able to provide such service. Nonetheless, the nature of the new information resources will require specialized expertise in every institution that collects and makes available these resources for public access.

- The Federal depository library community should build on and strengthen its ties to the Bureau of the Census and to the State Data Center program. This includes local, state, and national level involvement through improved awareness, regular communication, and the exchange of information and expertise.

In order to implement these board recommendations, a number of steps that could be taken include the following:

- The Bureau of the Census, the State Data Center program, the Depository Library Council to the Public Printer, ALA/GODORT, and other appropriate organizations should work closely together to identify specific steps that need to be taken to assist Federal depository libraries in planning and implementing access to data in electronic form. Outcomes might include a conference or conferences, written guidelines, training sessions, and/or referral directories of experts who would agree to share their knowledge. Ideally, the project would receive widespread support and publicity at all levels of involvement.

- The depository library community should make a concerted effort to educate its members about the existence of and features of electronic bulletin boards. This might be a project of the Depository Library Council or a unit of ALA/GODORT. Electronic bulletin boards are often haphazardly publicized and inadequately understood as sources of information.

- In a related matter, the Bureau should investigate the possibility of opening up access to the State Data Center electronic bulletin board to all GPO depository libraries. This would be a big increase in potential users over the current base of State Data Center participants, but it would involve a group already committed to provide access to census data.

- The depository library community and the State Data Center program should work toward:

  - The development of standards, readily available information about contact persons, services, fees, for every level of State Data Centers in all states to facilitate referrals to the program;

  - Better communication about enhancements and new materials from State Data Centers. Ideally, State Data Center publications could be made available free to Federal depository libraries. If this were not possible and documents must be sold to recover costs, ordering information should be publicized. Another suggestion is for a subsidy from the Bureau to enable the free distribution of State Data Center publications to depository libraries;

  - Consistent standards for minimum services that clients can expect from all State Data Centers;

  - Increased consultation between the library community and State Data Centers in preparation of information products and user guides;

    - Cultivation of regular contacts and ongoing communication between libraries and State Data Centers at the state and affiliate levels; and
    - Regular publicity about the State Data Center program in library newsletters, meetings, and publications.

- ALA/GODORT should revive the State Data Center liaison position that has fallen vacant in recent years. This provides a good mechanism for ongoing State Data Center/library communication.

- There should be a formal contact between the State Data Center Steering Committee and the Federal depository library community. The chair of the State Data Center Steering Committee has expressed willingness to create a Library Subcommittee. Both the State Data Center Steering Committee and Depository Library Council meet in Washington in October of every year. This offers an ideal occasion to exchange information between these two providers of census data and information.

These recommendations are not intended as a comprehensive listing of possible strategies. Rather, they are offered as a beginning point of discussion to enhance access to and dissemination of census data through the depository library program.

Chapter Three

General Public Policy Issues

This chapter incorporates the discussion from the focus group interview held in Washington D.C., with policy leaders. Instead of examining the eight questions individually, the discussion cuts across the questions and probed underlying policy issues that could impact the emergence of the depository library program as an electronic network, the rapid assimilation of technology in the depository program, and the dissemination of electronic resources through the program.

IMPROVING RELATIONSHIPS AMONG KEY ORGANIZATIONS

There is a need to clarify the relationships and roles that key organizations play in the dissemination of census data. Some key organizations include the depository library program, State Data Centers, and the State Library agencies. The State Data Centers appear to be taking a more active and involved role in the dissemination of census data. However, it is unclear how that role will evolve in the future.

The state libraries might take a stronger leadership stance toward networking, resource sharing, technology planning, and education/training within their state. These libraries might have a key role to play in improving public access to Census Bureau data.

Unfortunately, the specific roles of the state libraries, the depositories, the State Data Centers, and the Census Bureau itself are unclear. A key issue relates to who should clarify these roles, and what roles will emerge?

INCREASED PRESSURE FOR COST SHARING

In all probability, there will be increased pressures on the depository libraries to adopt "cost-sharing" and user fees related to the dissemination of government information and data, including those emanating from the Bureau of the Census. Despite the fact that "everyone" is looking to share or shift costs, depository libraries have yet to make a persuasive case for the amount of resources they already expend on disseminating government information. They must show potential savings, as well as the costs incurred for acquiring new forms of information.

Mawdsley (1990) presents costing data on depository libraries showing that 6 percent of the depositories spend at least $21.4 million annually and provide public access to government information. These data, however, may be unreliable and lack comparability, because of the methods by which the data were collected and the lack of a common definition of cost. Undoubtedly, some within the Federal government may not realize the extent to which depository libraries already share costs for the dissemination of government information.

The library community must be more politically involved in various policy debates. This is especially important now that numerous cost sharing and user fee strategies have been introduced at the state and local levels. The Federal government is now using some of the strategies adopted at the state level.

THE CHANGING TECHNOLOGICAL LANDSCAPE

Remote Access

There will be increased remote access to a range of government information in general and census data in particular. The ongoing development of the Internet and the National Research and Education Network (NREN) are just two examples where remote access to government information can be enhanced. Furthermore, local and wide area networks will promote the development of the notion of "libraries without walls." Depository libraries need to participate in this change and should not be left standing on the sidelines.

By the next century, PC-based technology will capture larger datasets than is possible today. Libraries will tap networks of statistical databanks and provide their users with access to more data than they can now. Users will also dial-up files to which libraries subscribe and have direct access to datasets from sites outside the library. Libraries will need to better exploit these opportunities. They need to better understand how library services might change as a result of increased remote access; and to develop strategies to respond effectively to this changing technological landscape.

Government Standards

By the year 2000, there will likely be some standardization of technologies and protocols. The degree of standardization may vary greatly depending on the particular technology in use. Standardization could significantly assist depository libraries in their efforts to disseminate government information. However, the library community and the Bureau of the Census will need to work together in determining these standards.

Disparities across Types of Libraries

Not all depository libraries will be able to respond equally as well to the new technology environments -- of special concern are smaller and more rural libraries. The issue is not only resources to obtain and implement the technologies, but also the need for knowledgeable and technologically competent librarians to direct this changing environment.

It is unclear what type of disparities in technology utilization exist among depository libraries. Research might examine the degree to which some libraries adopt new technologies and others do not, and ask the question why? A key question is "How much disparity among depository libraries (in terms of technological development) are we willing to accept?"

User-Friendly Electronic Information

Electronic information from the government needs to be more user-friendly. If librarians cannot make sense out of some of these electronic files, how can users be expected to do?

Better Use of Technologies in Libraries

Both now and in the future libraries can do much to exploit available technologies for improved dissemination of information. We all know of poorly designed and implemented information technologies in library settings, and some libraries have complained of the "unbelievable" costs associated with using and implementing the technologies. A couple of the participants in the focus group interview suggested that a number of depository libraries might be unsure how to best exploit new information technologies for increased access (as opposed to storage) of government information.

Predicting the Technological Future

The range of technological options may be endless, or at least hard to predict. Indeed, the "workstation of the future" is likely to differ significantly from that of today. Researchers are likely to have very powerful workstations with a broad range of storage and remote access capacity. To what extent will depository libraries have similar or compatible workstations?

CD-ROM is likely to remain a valuable storage technology for the foreseeable future because of its low cost, large capacity, and durability. Still, key issues relate to the degree of compatibility, connectivity, and integration of technology. The greater the degree, the more likely that technology will be used -- assuming that the technology has many applications and a proven track record.

REVISION OF PARTS OF TITLE 44

The GPO may be losing power relative to other Federal agencies, in part, because some of the oversight committees related to GPO and information policy are not among the "key" committees in Congress. Economics and the government's desire to shed some of its information dissemination responsibilities will likely drive the formulation of new laws affecting the depository library program.

Some of those interviewed thought it was not necessary to revise the definition of a government publication contained in 44 U.S.C. 1901. They thought that the recent memorandum from GPO's General Counsel had the effect of law (General Counsel, 1989). They also thought that it might be a mistake to try to rewrite the definition given the current congressional attitudes and priorities. Others disagreed; they believed that the definition of a government publication or information resource should not be left to the interpretation of the General Counsel. Rather, the definition should be contained in statutory law.

PROMOTING THE DEPOSITORY LIBRARY PROGRAM

Librarians need to "make a fuss" about what they do, how well they do it, and the importance of obtaining additional resources to do a better job. Depository libraries must look beyond day-to-day problems and concerns, and lay the future technological foundation for the "library without walls." What specific value does a depository library add to government information? There is a need to be able to demonstrate the value of the depository library in terms of cost-effectiveness.

Those interviewed expressed concern about re-educating or providing new education and training to the depository library community about technology and technology utilization. Participants recognized that there currently is little reward for those librarians that do engage in ongoing continuing education and that it may be difficult to encourage such re-education to take place. They questioned: "Shouldn't the GPO and the Bureau of the Census have responsibilities in this area?"

ROLE OF THE PRIVATE SECTOR

The consensus of the group was that it was likely that the government would increasingly rely on the private sector for the dissemination of government information. There was some uncertainty, however, about what exactly the role of the private sector would be.

Some individuals commented that the existing model whereby the government capitalizes the start-up and then a private sector firm moves to take the service over and operates it for a profit was dysfunctional. They suspected that a better model would have the private sector providing user friendly and value added "front-ends" to basic government information services and products. They noted that there are a number of areas where the depository libraries could profit from enhanced "front-ends" on various government information systems.

EXCESSIVE DECENTRALIZATION OF ELECTRONIC INFORMATION

The issue was raised about the difficulties in determining where government specific electronic information products could be obtained. The group noted that there was confusion even with census products since some of these products are available directly from the Bureau while others, they suspected, might be available from the National Technical Information Service (NTIS) or the GPO.

There was concern that the greater the decentralization of electronic information, the greater the difficulty for the depository libraries in identifying and acquiring that information. At a policy level, however, the group saw little likelihood that statutes or regulations would be passed to address this situation.

POLICY FRAMEWORK AND POTENTIALLY SIGNIFICANT POLICY ISSUES

Figure 3-1 identifies broad areas that affect the availability of government publications, or information resources, to the GPO for distribution to depository libraries. This report discusses issues only in the context of census data, not general, government information.

Basic issues are not mutually exclusive. Decisions regarding one issue impact other issues. Depending on the answer to the set of issues, though, the depository library program could remain as it is, increase or decrease as far as technological applications, or become a significant purveyor of electronic information to the public. A new or expanded role for the depository program in the next century requires:

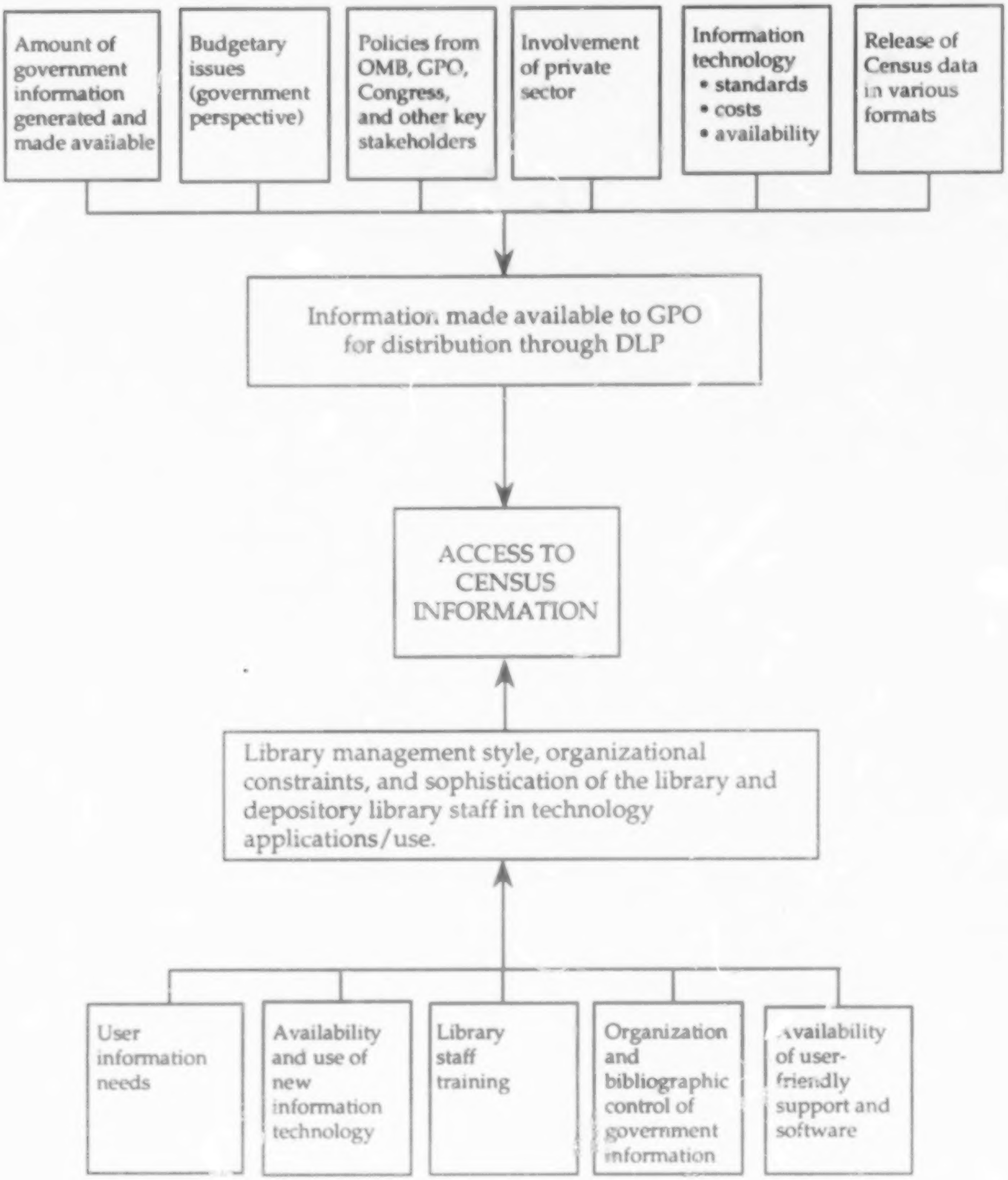
- Planning;
- Technologically knowledgeable and trained librarians;
- An adequate number of staff; and
- Opportunities for user training.

A concern underlying the resolution of many of the issues identified below is how do we achieve the prerequisite education, training, and planning. Proper attention to these factors (as well as resolving legal issues) could result in the emergence of a depository library program envisioned by many -- a network linked technologically to the Federal government and member libraries as well as other safety nets within and outside the United States.

In an information age, unless libraries keep abreast of data analysis techniques and provide electronic information, they will be relegated to the role of a storehouse for preserving

Figure 3-1

Key Policy Areas Affecting Access to Census Data


Amount of government information generated and made available
Budgetary issues (government perspective)
Policies from OMB, GPO, Congress, and other key stakeholders
Involvement of private sector
Information technology • standards • costs • availability
Release of Census data in various formats
Information made available to GPO for distribution through DLP
ACCESS TO CENSUS INFORMATION
Library management style, organizational constraints, and sophistication of the library and depository library staff in technology applications/use.
User information needs
Availability and use of new information technology
Library staff training
Organization and bibliographic control of government information
Availability of user-friendly support and software

humanistic and historical records. Libraries are in the information, not book, business, and can play an important role in managing information resources and enabling their clientele to become information literate. Now, and in the year 2000, librarians must be change agents and adaptable to a rapidly changing environment. They must also face and respond to challenges from competitors, ones offering access to electronic information and providing supportive technical and reference services.

Depending on the decisions made by the Bureau of the Census within the next five to 10 years, the Bureau could require all depository libraries wanting access to census data to accept electronic products. The Bureau could declare that paper copy is a medium of the past and that it will only distribute data in a particular medium -- CD-ROM or whatever. Libraries would have no choice but to shift their budgets to accommodate the expenditures. Census data are that important to depository libraries and their clientele!

Conceivably, the Bureau could provide copies of all its information sources to a division within it, or to another agency, e.g., the National Archives. Anyone wanting census information could dial an 800 number. If they wanted detailed information, requiring the manipulation of datasets, they could be referred to another number or the private sector. Such a service could displace libraries as providers of census data. As this extreme case illustrates, there are endless scenarios of what the future might hold.

It is not the intent of this report to identify all possible scenarios and to discuss their feasibility. Rather, it is important to realize that whatever future emerges must have addressed the types of questions listed below.

Given the historical role that the library community has played in the provision of government publications to the public, it is impossible to envision a realistic scenario that did not include libraries as one of the vital safety nets for providing and servicing government information resources.

It would seem that depository libraries will always have a need for the receipt, storage, and use of census publications in paper copy. At the same time, they are increasingly making use of other formats, particularly CD-ROM. Clearly, there is need for national planning that takes into account the entire membership in the depository library program as well as other interested parties in providing access to census data.

Legal Issues

1. What definition of government publication will 44 U.S.C. 1901 contain? Will the present definition remain and be

intermediary, i.e., a programmer?

5. What will be the budgetary situation for depository libraries? Will libraries receive more, less, or the same level of institutional support by 2000?

6. How much technology can these libraries absorb and devote to census uses?

7. What networks will emerge and how can networking be advanced within the legal framework set by 44 U.S.C., Chapter 19?

8. What services will depository libraries initiate to make government publications more available to public, e.g., the offering of a publicly available terminal?

9. How can depository librarians influence the public and policy makers and obtain increased support for the depository library program?

10. How can the true costs of depository status be determined? What impact will such assessments have on policy makers? Cost sharing differs from cost shifting; how do we achieve the proper balance between the two?

11. As the relationship between the U.S. and other countries of the world (e.g., Eastern Europe and the Soviet Union) rapidly changes, will there be opportunities for the depository library program to evolve and assume more of an international orientation? Would such an orientation necessitate a depository library having telecommunication linkages?

12. Because development of a more technologically oriented depository library program requires planning, what planning will emerge? Who will provide that planning, etc.?

13. Will (should) depository libraries be at the cutting edge of technological applications? If it is not at the cutting edge, how far can (should) the program lag behind?

14. To maintain the traditional level of access to government information in the future (as more and more files become available on-line), will it be necessary to give depository libraries on-line access to government data files? If yes, which ones? What are the criteria for making the decisions?

15. If depository libraries are to receive access to on-line services, how will this be accomplished? If on-line access is permitted, what will be the implications for individual library services and programs?

16. Who will provide training for librarians and users?

Issues for Library Community at Large

1. What support will this community provide to the depository library program?
2. Will state libraries assist public libraries, and public academic libraries, in acquiring technology and learning how to use it?
3. What role will professional associations and library schools play?

Government Perspective (Other than the Bureau)

1. Will the government maintain a high level of commitment to the provision of government information to the public?
2. Will economic issues dominate policymakers' decisions? Will government information as a commodity having economic worth drive the response of policymakers? How will such a perspective influence the role that the depository library program plays in the provision of government information to the public?

CONCLUSION

The next chapter groups the issues discussed in this chapter, as well as the previous one, into general themes. The more general theme areas were explored to determine which ones have the most significance to depository librarians and GPO staff -- those attending the Depository Library Council to the Public Printer in April 1990.

NOTE

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[1] A participant in one of the focus groups disagreed that the library community must be more politically involved in various policy debates. This person maintained that "the library professional associations have been too involved. They only see one side of a policy issue and not necessarily represent the citizens of this country. I believe that the citizens can speak for themselves, rather than the library community appearing to speak for them, and I believe that the general public has an entirely different view of what policies are needed. It also seems to me that the Congress and the Departments and Agencies as well as the oversight agencies are becoming tired of the librarians' letters and resolutions!"

Moreover, "there is a need for a complete, unbiased review of the depository library program. We should be examining the needs for the program, the need for so many libraries ... with present technology, the costs associated both on the part of government and on the part of the participating libraries. Libraries must understand their responsibilities and the costs before requesting to be designated as a depository library. I personally believe that there are far too many, and that many are not able to handle the program once they are in it.... There are few, if any efforts, to develop programs for making information available to the end users in new and innovative ways. That's probably where we should be concentrating our efforts. They could then provide service from centralized libraries, such as regional depositories, and provide access outlets at the smaller libraries with very little expensive equipment."

"It is important that the libraries plan for participation in the depository library program, not just for receipt of the documents, etc. That will require an entirely different approach to the costs and to the technology required. I don't believe that they are doing an adequate job on the national front, much less take on international responsibilities."

"I am concerned that we are supporting an ineffective program, which meets the needs of those who want to see it continued in the same old way.... I do believe that the new technology offers us an opportunity to change all this, but it will have to be done with an entirely new approach to the number of libraries, a hierarchy of service levels, and a comprehensive approach to participation in the program and sharing of resources. Costs will remain too high until this happens, and we will continue to find many dissatisfied with the program overall."

Chapter Four

Key Issues for Public Debate

One important objective of the study was to identify key issues that may require national discussion if census data are to become more accessible to the public through GPO's depository library program. This chapter describes the process that the investigators used to identify and rank those key issues. The chapter also identifies the issues.

Based on the review of the literature, focus group interviews, and other data collection activities (see Appendix A), the investigators compiled a preliminary list of key issues that appeared to be especially important and could be considered as candidate issues requiring public debate. These are listed in Chapter 2 after the discussion of each of the eight issue areas. In order to reduce the number of issues to a more manageable set, one devoid of duplication and emphasizing perhaps the most significant issues, the investigators developed criteria for the selection of preliminary issues. The four criteria were:

- Potential impact of the issue on more than one stakeholder group;
- Degree to which the issue could affect public access to census data;
- Potential controversy surrounding the issue; and
- Likelihood that issue resolution could involve significant allocation, or reallocation, of resources.

Using these criteria, 32 candidate issues were identified. Selected experts in the field reviewed the issues. After additional review and discussion of the proposed issues, the 32 issues were paired down to 20 issues. Figure 4-1 identifies the 20 issues having the greatest potential for affecting public access to census data in depository libraries for the year 2000.

In short, the investigators saw all the issues listed in the Figure as potentially "important" in providing access to census data in the year 2000. But as a means to obtain external validation of these issues and to provide a ranking of their relative importance, they designed, pretested, and administered a questionnaire to attendees at the Depository Library Council meeting, April 26-27, 1990, at Phoenix, Arizona (see Appendix D for a copy of the questionnaire).

During the Council meeting, an official from the Bureau of the Census and one of the investigators provided an overview of the study and encouraged participants to complete the questionnaire. Both investigators distributed copies of the questionnaire to attendees and asked them to return the completed form either before the end of the meeting or within a week.

A total of 59 completed and usable questionnaires were received and processed. It is important to emphasize that the respondents to the questionnaire are self-selected and probably have a specific interest in census information services or products, are especially knowledgeable about census information services or products, or, for what ever reason, especially wanted to provide input to the study. Nonetheless, the intent of the survey was to obtain input primarily from those individuals who saw themselves as especially interested in census information products or services and wanted to offer their assessment of the key issues.

The demographics of all the individuals completing the questionnaires is unknown. However, the investigators observed some individuals returning completed questionnaires and can attest that respondents did include depository and nondepository librarians, and government officials. While care should be taken in drawing conclusions or making recommendations based on questionnaire results, the findings do provide a valuable "field-based," but preliminary, assessment of the issues.

The investigators entered and analyzed completed questionnaires on a personal computer spreadsheet. Given the nature of the data and the data collection process, it was inappropriate to produce statistics other than averages (means) and rankings. Figure 4-1 presents the average scores and rankings of the issues.

Interestingly, respondents ranked all the issues relatively highly or as having special importance. The lowest score received on a particular issue was 2.65 (on a scale of 1 = very unimportant; 2 = unimportant; 3 = somewhat important; and 4 = very important). Twenty-six of the 29 issues (two questions had multiple parts) received a score of 3.0 or higher. That so many of the issues were ranked highly confirms the perceived general importance of all the issues to the respondents.

Listed in order of importance, the eight highest ranked issues on Part I of the questionnaire were:

1. The degree to which the Census Bureau produces products that are "user friendly (issue 1);

2. The extent to which the Census Bureau provides through the Depository Library Program, data in paper format (issue 7a);

3. The extent to which the Census Bureau provides through the Depository Library Program, data in CD-ROM (issue 7b);

Figure 4-1

ASSESSMENT OF TOPICS/ISSUES

PART I

TOPICS/ISSUES	SCORE*	RANK
1. The degree to which the Census Bureau produces products which are "user friendly"	3.88	1
2. Restructuring the Depository Library Program to take advantage of new technologies	3.24	18-19
3. Coordinating State Data Center services with Depository Library services	3.25	17
4. Census Bureau training programs in technology utilization for depository librarians	3.49	9-10
5. Ability of depository libraries to purchase new information handling technologies	3.66	4
6. Involvement of the private sector to provide "value added" services and products	2.93	27
7. The extent to which the Census Bureau provides, through the Depository Library Program, data in the following formats:		
a. Paper	3.77	2
b. CD-ROM	3.67	3
c. Microform	3.08	24
d. Electronic Bulletin Boards	3.30	15
f. On-line Data Bases	3.28	16
g. Magnetic Tapes	2.65	29
h. Personal Computer Diskettes	2.88	28
8. Coordinating Census Bureau depository library services with GPO depository library services	3.44	12
9. Depository librarians' skills and competencies to use the new information technologies	3.65	5-6

Figure 4-1 (Continued)

ISSUE	SCORE*	RANK
10. Adequate levels of support for depository libraries in terms of:		
a. Staffing	3.49	9-10
b. Collections	3.43	13
c. Information technologies	3.63	7
d. Training	3.65	5-6
11. The degree to which the private sector develops "user friendly" software for electronic Census data	3.14	23
12. Degree to which librarians will be expected to analyze and/or manipulate data in the various electronic formats rather than providing the overall product itself	3.22	20
13. Changes in Title 44 USC regarding the role and responsibilities of depository libraries	3.21	21
14. Increasing knowledge and sophistication of users in requesting Census data	3.24	18-19
15. Availability of customized and individualized services and products made directly available to the public by the Census	3.01	25
16. Direct user on-line access to remote databases containing Census data	2.98	26
17. Cost-sharing between depository libraries and the Federal government and/or private sector vendors in the provision of Census data	3.32	14
18. The inclusion of self-instructional information in Census products	3.45	11
19. The degree to which ALL Census products are made available through depository libraries	3.62	8
20. The degree to which library user fees are needed to support the provision of Census products to the public	3.15	22

* The key for scoring was 1=very unimportant; 2=unimportant; 3=somewhat important; and 4=very important.

Figure 4-1 (Continued)

PART II

Of all the issues ranked as "4" (very important) the following were assessed as most important and requiring public debate and resolution:

RANK	ISSUE NO.	ISSUE
1	1	The degree to which the Census Bureau produces products that are "user friendly."
2	19	The degree to which ALL Census products are made available through depository libraries.
3	5	Ability of depository libraries to purchase new information handling technologies.
4	2	Restructuring the Depository Library Program to take advantage of new technologies.
5	17	Cost sharing between depository libraries and the Federal government and/or private sector vendors in the provision of Census data.
6	20	The degree to which library user fees are needed to support the provision of Census products to the public.

4. Ability of depository libraries to purchase new information handling technologies (issue 5);

5-6. Depository librarians' skills and competencies to use the new information technologies (issue 9);

5-6. Adequate levels of support for depository libraries in terms of training (issue 10d);

7. Adequate levels of support for depository librarians in terms of information technologies (issue 10c); and

8. The degree to which all census products are made available through depository libraries (issue 19).

These eight issues are closely clustered together in terms of their average scores. There is a clear "break" between the scores of these issues and those of the remaining issues.

The ranking of these issues as "most important" validates the comments made to the investigators during the focus group sessions held at the Depository Library Council meeting and elsewhere. Clearly, these eight issues were consistently and repeatedly mentioned as critical for the provision of census data through the depository library program.

The final part of the questionnaire asked participants to rank the top five issues -- only from among those they listed as a "4" (very important). This technique provided a filtering process whereby only those issues first ranked as very important could then be considered. This technique was included for two reasons:

- It was anticipated that participants might rank many of the issues as "very important;" and
- The results would provide an interesting comparison to the results from the first part of the questionnaire where rankings were based on the averaging of all scores.

Interestingly, using this technique six issues were closely clustered as receiving the highest ranking; other issues mentioned were ranked considerably lower.

The highest ranking six issues identified, of those that had first been assessed as very important, were (in order of highest ranking first):

1. The degree to which the Census Bureau produces products that are "user friendly" (issue 1);

2. The degree to which ALL Census products are made available through depository libraries (issue 19);

3. Ability of depository libraries to purchase new information handling technologies (issue 5);

4. Restructuring the Depository Library Program to take advantage of new technologies (issue 2);

5. Cost-sharing between depository libraries and the Federal government and/or private sector vendors in the provision of Census data (issue 17); and

6. The degree to which library user fees are needed to support the provision of Census products to the public (issue 20).

The first three issues listed here match those identified as most important in the first of the questionnaire. But issues on restructuring the depository library program, cost sharing, and user fees replaced, as "most important," those related to ability of depositories to purchase new technologies, depository librarian skills and competencies, and training for depository librarians.

It is especially interesting that these three additional issues were identified as "most important" in Part II. That they were identified suggests that many participants in the survey believe that greater attention and discussion is needed on restructuring and user fees/cost sharing. Again, these issues also surfaced repeatedly during the focus group interviews.

In conclusion, the issues listed in Figure 4-1 provide a useful beginning point for public debate on improving access to census data through the depository library program in the year 2000. The eight issues identified in the first part of the questionnaire and the six identified in the second part, however, are perhaps most likely to be the key issues to frame national discussion involving public access to census data through the depository library program in the year 2000.

Chapter Five

Future Scenarios

The use of libraries will change as homes and offices are connected to libraries over local networks via wide-band channels, such as an optical fiber or a cable TV conduit. People will be able to access on-line library catalogs, and librarians will expand the diversity of holdings and options contained in these catalogs. Individuals will be able to search their local library (and other libraries as well) electronically to select and retrieve information and data useful for a variety of purposes.

Libraries already include all resources, including computer tapes and government publications, in their on-line catalogs. Accessibility to on-line catalogs become increasingly important as libraries place more than bibliographic records for their holdings here. Library catalogs now contain acquisition systems (tracking titles from order to receipt and processing), Legislate and Westlaw, e-mail, access to bulletin boards, and the searching of selected indexes and other reference sources.

Pennsylvania State University Libraries, for one, offers many of these services and is planning on expanding such services through its on-line catalog. The Libraries plan to offer subject database searching through the on-line catalog, assuming legal and other matters can be resolved.

From remote sites, library users can access library holdings, check for and request specific titles, send and receive messages, search bulletin boards for information and datasets. At some point, they might be able to use magnetic tapes mounted at an academic computing facility.

Having access to larger computers -- mainframe and mini-computers -- libraries can expand to types of services included in on-line catalogs. With appropriate technology, they will also be able to create LANs that provide multiple access to CD-ROM products. (To minimize the need to master many software packages, there is need for general overlays that make the use and manipulation of machine-readable datasets and information resources easier.) The diversity of library services will continue to expand and provide library users with increased opportunities for linkage to resources available from other information providers.

The Bureau of the Census offers products and services through various channels. Depository libraries, for example, have increased opportunities to draw upon these resources, e.g., the bulletin board of the State Data Centers. As is evident, the

GPO does not fulfill an exclusive role in the provision of government information resources and datasets to depository libraries, and library users.

Some discussions of future scenarios and structural arrangements for the depository library program fail to address the decentralized information environment, even that providing access to government information. Libraries pursue technological and other avenues that best meet their needs. In other words, their holdings of government publications comprise one element in the larger provision of information services and sources to the public. As on-line catalogs and LANs provide access to more information resources, distinctions about the source of the resources (government or nongovernment) may lose their significance.

A key question is: "How can the Bureau of the Census and the depository library program better exploit this evolving network environment?"

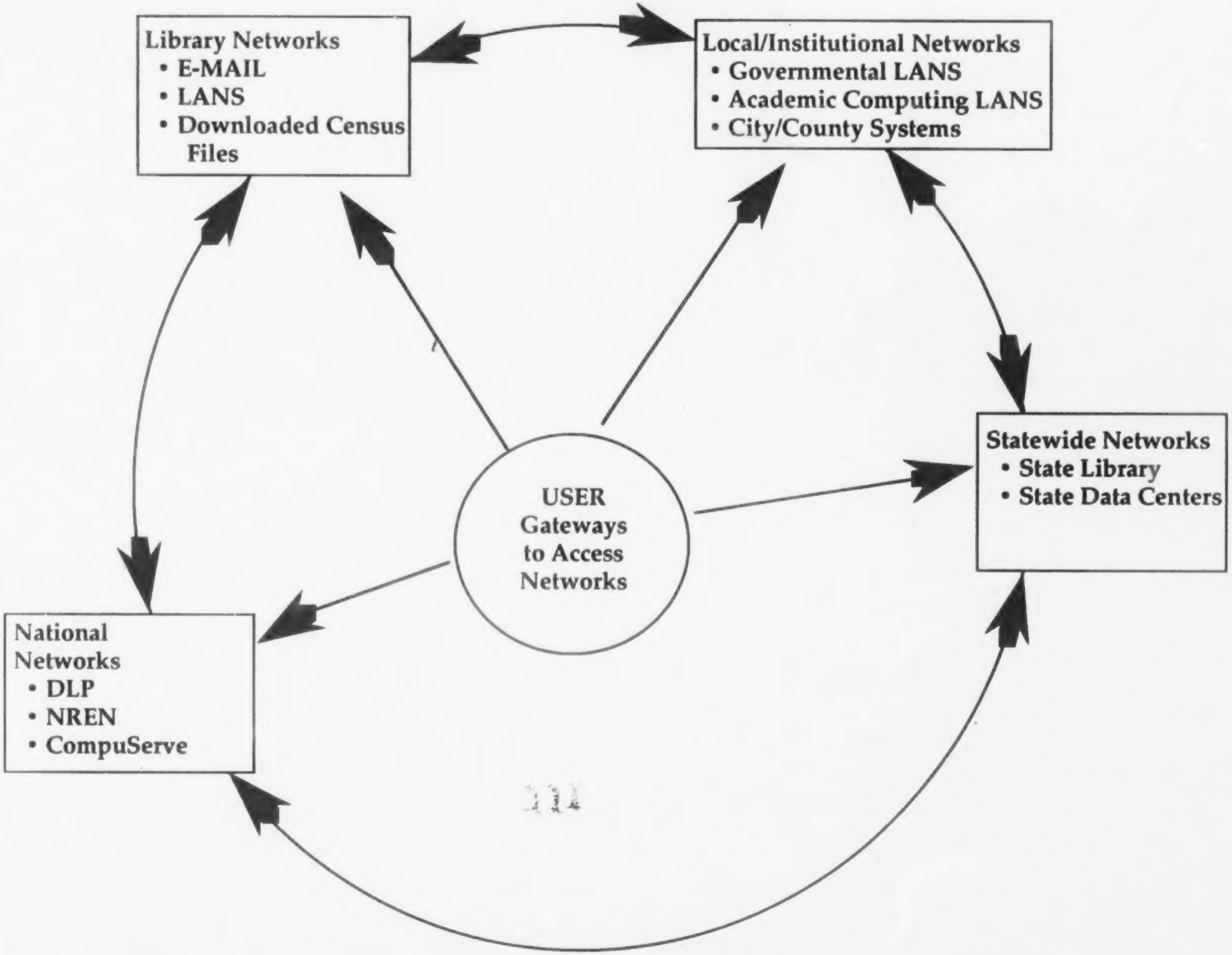
Figure 5-1 depicts a decentralized information system, one, however, that creates opportunities for libraries to serve as a connecting mode. As more local and regional systems emerge, how can they be linked to the depository program? The same applies to national and international systems. As Jack Sulzer of Pennsylvania State University pointed out during one of the focus group interviews, "network development is a significant tool for providing library clientele with better access to resources." With networking, libraries can play an even more vital role as a safety net serving society in the information and electronic age.

A decentralized network-based information system favors those libraries with larger budgets and staffs, as well as a greater commitment to the use and mainstreaming of electronic information products and services. A central reason for reviewing and perhaps amending the structure of the depository library program would be to ensure that all depositories (the information and technology "haves," "have nots," and "have somes") can meet the information needs of the clientele they serve.

In this regard, it becomes important to identify the "haves" and the other categories, and to explore ways to develop resource sharing and interlibrary cooperative arrangements. In an interview conducted at the Depository Library Council to the Public Printer, in April 1990, Sulzer offered a strategy for identifying those depository libraries at the cutting edge of technology. Based on an idea presented to him by Stephen Hayes of the University of Notre Dame, he suggested that someone might examine the lists of libraries wanting to participate in the GPO pilot projects, as well as the lists of those libraries actually selected for participation. Assuming there is a pattern and some continuity among the libraries labeled as technology leaders, the list might serve as a basis for review of the depository library structure. Do all regionals serve in leadership positions? Is

Figure 5-1

Future Networking Structures for Accessing Census Data



Library Networks
- E-MAIL
- LANS
- Downloaded Census Files

Local/Institutional Networks
- Governmental LANS
- Academic Computing LANS
- City/County Systems

Statewide Networks
- State Library
- State Data Centers

USER Gateways to Access Networks

National Networks
- DLP
- NREN
- CompuServe

the list confined primarily to ARL libraries?

It is now less important that libraries physically hold the resources needed by their clientele. They must be able to access needed resources and to place some confidence in the authoritativeness, accuracy, and currentness of the information and data found. They also want to be sure that some source(s) -- regional depository or the National Archives and Records Administration, for instance -- maintains archival copy.

In the information and electronic ages, librarians serve more as information resource managers and information access professionals. They spend increasing amounts of time on information management and organization. They provide information and data on demand, and serve as referral agents -- linking information providers and safety nets.

But in this new environment, the implications of libraries having to charge user fees to recoup some costs has not been fully explored in this report. It is our belief that user fees and cost-effectiveness comprise topics requiring separate analysis. It might be noted; however, that, under some programs, state libraries (as well as other publicly supported libraries) that use LSCA funds or other local funds may be prohibited to pass along user charges to other libraries and state residents.

POTENTIAL CONFLICT WITHIN ACADEMIC INSTITUTIONS

The low cost of many census products in electronic form, combined with the vast amount of data available, may encourage more academic computing units to acquire more electronic census products. At the same time, more depository libraries may turn to these units for support. These librarians may look to mainframe computers to provide access to more optical disk information and data. At this time, the mainframe computers at many universities operate at over-capacity. If the mainframe capacity problems are resolved, this technology provides a means of distributing more information and data to specialized audiences.

Peek (1990) questions:

> Can computing units do a better job with ... [electronic census data] than the library? ... Can computing units legally become the keepers and caretakers of this information? ... How willing are academic libraries to turn over this responsibility to the computing center? Who knows?

Computing units have the technical staff and financial base often lacking in libraries. On the other hand, they lack the service tradition of academic libraries.

Peek (Ibid.) argues "that computing units are going to play an increasing role in the administration of electronic formats of all data." They have a different "philosophical orientation and staff composition" than do libraries. As long as universities rely on the depository program for access to government publications, libraries will play a significant role in deciding the location for service points and housing census products. Cost will be an inhibiting factor for some academic computing units, but not for others. Clearly, future scenarios involving academic research libraries must address the relationship between academic computing units and libraries. There will undoubtedly be variation in the model that different institutions adopt.

POSSIBLE SCENARIOS

A focus group interview conducted at the meeting of the Depository Library Council, in April 1990, concentrated on future scenarios depicting a cooperative relationship between the Bureau of the Census and depository libraries.

The use of established networks enables depository libraries to bypass the GPO and provide increased services and products to their clientele. This is not to say that the GPO is a stumbling block; rather, libraries have opportunities to gain access to more resources than just those going through the GPO and the National Technical Information Service.

Future scenarios might include a restructuring of the depository library program. Some scenarios might include regional depositories, whereas other might not, or might suggest fewer than the present 54. Clearly, if someone is not limited by the language of Title 44, U.S.C., Chapter 19, the number of scenarios is virtually endless. It would seem, though, that for a number of scenarios involving the GPO as the lead Federal agency in administration of the depository program, that agency would have to build a stronger and more viable position in regard to the provision of electronic information resources to the library community.

Some scenarios might involve a merger of the State Data Center program and the census and GPO depository library programs, or at least an expanded cooperative program among them. The lead agency (or agencies) may vary from state to state, Other scenarios may involve linkage with networks such as the proposed national research and education network (NREN) (see McClure, Bishop, and Doty, 1990).

There might also be a governmental network where individuals and libraries call up a mainframe computer containing a menu of government databases. They might be able to query a database directly. Instead of creating a governmentwide network, there might be a departmental (e.g., Department of Commerce) or agency (e.g., Bureau of the Census) network. As an alternative, the Federal Information Center program of the General Services Administration, now operated under private sector contract, might be expanded.

MOST FEASIBLE SCENARIO

It would seem that the present decentralized system will remain well into the next century. New components will be added to Figure 5-1, especially in the area of accessing Federal scientific and technical information. Various depository programs will remain in existence. The one administered by the GPO may include more electronic information products, and the gulf between the technological "haves" and "have nots" will widen. More libraries may be labeled as "have somes." Libraries will expand their ability to engage in resource sharing and provide their clientele with resource sharing. At the same time, more people with microcomputers in their homes and office, and having modems, will be able to obtain remote access to increased library collections and services, as well as accessing data directly from government agencies and providers.

A scenario proposed by some depository librarians is modeled after the Patent depository library program. Those libraries agreeing to serve as patent depositories are provided with a range of resources, equipment, and training -- directly from the Patent and Trademark Office. For their part, the libraries recognize that significant resources will have to be allocated within the institution to support the patent depository program. The main point being that a select few libraries receive this status, but they receive significant and direct assistance from the government to support their services and activities.

Since regional libraries may not provide an adequate leadership role in each state, more libraries within a state may be cooperating to fill this void. At the same time, the GPO may not be exercising an adequate leadership role. Furthermore, the depository program may not be fulfilling an archival role, or if it is, that role may be limited to the preservation of paper copy and microforms.

In summary, most scenarios consider the provision of government publications and information sources, including census products. With the Bureau of the Census providing publications in paper copy and expanding its delivery of CD-ROM and bulletin boards, the agency meets the short-term needs of depository libraries. Depository librarians would welcome the discontinuance of microform by the Bureau and its replacement with CD-ROM. As technology develops, the library community will develop networks to handle multiple CD-ROM products.

Depository librarians regard census publications as being of critical importance to their collections and clientele. They want access to as many publications as possible. For what they cannot acquire, they want to be certain that State Data Centers or other safety nets exist and that they can provide referral to these providers. There is great expectation that expanded networking systems will provide a means for quick and easy access to census products. Librarians look to the GPO and Census Bureau to provide innovative leadership to develop such distributed networks.

In short, the most likely future scenario is an "enhanced decentralized model" of census product dissemination. In this model, the depository libraries serve both as gateways and as resource centers to a range of census products available from the Bureau of the Census and private sector providers. The success of the enhanced decentralized model depends primarily on the success with which the depository libraries, the GPO, the Bureau of the Census, and other key players (e.g., State Data Centers and state libraries) can coordinate their activities and responsibilities. Furthermore, the success with which this model will operate also depends on the degree to which other Federal information dissemination efforts, such as the Federal Information Centers (operated by the General Services Administration), are included in such coordination efforts.

Currently, there is a leadership void in how best to coordinate and promote the effective dissemination of census products through the depository library program. A number of key stakeholders (e.g., the Depository Library Council to the Public Printer, the GPO, Bureau of the Census, the American Library Association's Government Documents Round Table, State Data Centers, and the private sector) need to propose initiatives and strategic plans. The source of the leadership, however, may be less important than that some source develops an initiative and offers a strategic plan.

EXPLOITING ONGOING DIALOGUE

One important finding from this study is that there is limited long-range planning to develop specific strategies for enhancing access to census products through the depository library program. Another is that evolving electronic networks and the ability to gain remote access to a range of resources will have significant impact on census information providers, users, and intermediaries. In addition, the increased provision of electronic information to library clientele places significant burdens on existing library staff and resources, since library depository collections tend to be inadequately supported. Librarians will have to obtain and master new information-handling technologies and, with limited resources, be able to explain them to their clientele.

The Bureau of the Census should open a dialogue with depository librarians and resolve a range of key issues, many of which are outlined in this report and summarized in Figure 4-1. Such a dialogue might include other key stakeholders and ultimately lead to a strategic plan for enhancing access to census data through the depository library program. For example, the Bureau might pursue ways to produce self-learning material and to train librarians in the use of new census products and services. If regionals download datasets and distribute customized packages to selective depositories, regionals will require additional staff and financial support. Clearly, there is a need for the Bureau of the Census to make specific commitments to the depository library program and to do more than merely make new products and services available, and to offer an occasional training program.

The Bureau should expand its dialogue with depository librarians, place them on key advisory committees, and remain sensitive to librarian needs. The view of many librarians interviewed is that the commissioning of this investigation was an excellent first step. But, they now look forward to the Bureau advancing specific proposals and strategies as a means to enhance public access to census data via depository libraries.

APPENDIX

Appendix A. Data Collection Techniques Used

In preparation of this report, the investigations relied upon the use of multiple and complementary methods of data collection. First, they commissioned papers from Mary Redmond, New York State Library; Cynthia Bower, University of Arizona; and Nancy Preston, Syracuse University. Information from the first two papers is incorporated into the body of the report, while the third paper appears as Appendix E.

The investigators conducted focus group interviews with depository and nondepository librarians, census personnel, GPO staff, and policy makers. The first such interview was held at the American Library Association's Midwinter meeting on January 7, 1990. The second interview was conducted on January 24, 1990 with personnel of the U.S. Government Printing Office. The site of the third interview was the Bureau of the Census, where the investigators meet with census personnel on January 25, 1990. On February 28, 1990, the investigastors conducted a group interview in Washington D.C. with policy makers. The fifth group interview was held on February 14, 1990, with the New England Documents Librarian Group -- Government Publications Librarians of New England (GPLNE), a NELINET Task Group. The final focus group interview was conducted on April 26, 1990 at the spring meeting of the Depository Library Council to the Public Printer in Phoenix, Arizona.

Upon the conclusion of each interview (with the exception of the final one), the investigators prepared a written summary of the interview and shared it with participants for comment. The participants corrected the text as well as provided supplementary information.

The investigators shared a draft of this report with the Bureau of the Census and received extensive commentary from agency personnel as well as the GPO.

In addition to these methods of data collection, the investigators requested public comment from announcements appearing in the APDU Newsletter and through BITNET (see Appendices B and C). They also used the questionnaire reprinted in Appendix D at the Depository Library Council to the Public Printer. And, finally, they reviewed and incorporated library and other literature as needed.

Appendix B.

REQUEST FOR PUBLIC COMMENT AS LISTED ON GOVDOC-L *

We are currently in the process of completing the study, "The Use of Census Bureau Data in GPO Depository Libraries: Future Issues and Trends," which is funded by the U.S. Bureau of the Census, 21st Century Staff. The objectives of the study are to:

- identify key issues that may impact on the role of the Depository Library Program (DLP) in providing the public with access to Census Bureau Data
- determine likely trends that will affect the effectiveness by which the DLP provides access to Census Bureau services and products
- provide a concise descriptive listing of key issues and policy questions relating to the role of the DLP as a safety net for Census Bureau data, specifically those issues and policy questions that may require debate and discussion in the professional community.

The study is NOT dealing with issues related to the 1990 Census. Rather, it is intended to assist the Bureau of the Census to better meet user information needs in its dissemination of data through the GPO depository libraries in the 21st century. The study began November, 1989 and the final report is to be delivered to the Bureau of the Census by June 30, 1990.

We are especially interested in obtaining comments regarding the following topics form Gov Doc-L subscribers:

- what information handling technologies are likely to be most important and useful for the Depository Libraries in the year 2000 for the distribution of Census data to depository libraries and in the dissemination of that data to users?
- what is the likely rate of absorption of new information handling technologies by the Depository Libraries? Will this rate of absorption vary by type or location of library? To what degree will the depository libraries be able to acquire and use the new technologies?
- what possible changes in the structure of the Depository Library Program might occur in the future? What structural changes might be made to improve the effectiveness with which Census data is disseminated through the Depository Libraries? How likely is it that such changes could, in fact, be enacted into law?

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* GOVDOC-L is an electronic network conference that can be accessed through BITNET.

- what are the developing trends in the use of Census Bureau data in the DLP? How might usage patterns by specific constituency group change in the future?

- who are, and who are likely to be in the future, major Census data users? For what purposes are they likely to be using Census Data?

- how might the depository library establish or re-define their relationships with other agencies (e.g., State Data Centers), that might increase access to and use of Census data?

- what is the likely future political "climate" for depository libraries and the likely views of key policymakers toward the Depository Library Program as it enters the 21st century?

Please remember that the context for these topics is the year 2000 and not the 1990 Census.

We would greatly appreciate your comments and viewpoints on these topics and questions. The comments will be analyzed as input for the final report to the Bureau of the Census. The comments, however, will be presented in summary form and will not be attributed to individuals.

Please respond through the GovDoc-L discussion group. Or, if you would prefer to send your comments directly to us, m,y bitnet address is CMCCLURE at SUVM. Feel free to contact Charles R. McClure (315-443-2911) or Peter Hernon (508-879-1418) if you wish additional information about the study.

Thanks in advance for your interest and participation.

Charles R. McClure
School of Information Studies
Syracuse University
Syracuse, New York 13244-4100

THE APDU NEWSLETTER * MARCH 1990

APDU Board Holds First Meeting of 1990

The Winter Board Meeting of the Association of Public Data Users was held on Friday, March 9, in Washington, DC. The is the first meeting at which new Board members Ken Hodges and Christine deFontenay were present. (A list of Board members appears on page 8.) The meeting was held at the offices of Mathematica Policy Research.

The traditional Winter Cocktail Party preceeded the meeting on Thursday evening. Friends and members of the Association gathered at Vie de France for good food and good talk. Barbara Aldrich of Data User Services, Bureau of the Census, arrived with decennial census posters and buttons that were snatched up in a flash.

At the meeting on Friday a subcommittee of the APDU Board was formed to look at the format of the Directory and the costs involved in its production. Next year should see some surprising revisions! There was intense discussion of several pieces of legislation that APDU is concerned about and letters are being drafted for Congressmen. (See the February issue of the APDU Newsletter for information on the 'Bates Bill' and the January issue for information on reauthorization of the Paperwork Reduction Act.)

The Board reviewed the figures for end of year 1989 and adopted a budget for 1990. Increases in the budget were made predominantly in the areas of salary and benefits for the Executive Director. Susan Anderson, who has been with APDU for nine years and has served as Executive Director for 4 years, has been working three-quarter time; the increases were necessary to reflect her change to full-time employment. The Board expects all other expenses to increase at marginal levels.

Contracts to continue the APDU Working Group on Census Products and the APDU/SIPP Committee have been received from the Bureau of the Census and accepted. The APDU/SIPP Committee will shortly be distributing a questionnaire to determine how SIPP data are being used and what problems are encountered in analyzing the data. The Working Group continues to be on-call to review data product plans for the Bureau of the Census. A local meeting of the Working Group was held on March 29 in Princeton, NJ and plans are underway for another meeting in August when many members will be in California for the American Statistical Association meeting.

SPSS Announces Price Reduction

SPSS Inc. of Chicago, IL has reduced the price of the SPSS/PC+ V3.1 base package from $795 to $595, as of February 27, 1990. SPSS/PC+ is a statistical data analysis package for MS-DOS-based microcomputers. The SPSS/PC+ package provides data and file handling routines, an array of statistical procedures, full report writing and plotting functions, and the popular graphing program Graph-in-the-Box.

Contact SPSS at 444 North Michigan Avenue, Chicago, IL 60611, (312) 329-2400 for more information about SPSS/PC+ and its other products.

Input Sought on Future of Depository Libraries

by Charles McClure,
Syracuse University

Peter Hernon and I are currently in the process of completing a a study on 'The Use of Census Bureau Data in GPO Depository Libraries: Future Issues and Trends,' which is funded by the Bureau of the Census, 21st Century Staff. The objectives of the study are to:

•Identify key issues that may impact on the role of the Depository Library Program (DLP) in providing the public with access to Census Bureau data

•Determine likely trends that will affect the effectiveness by which the DLP provides access to Census Bureau services and products

•Provide a concise descriptive listing of key issues and policy questions relating to the role of the DLP as a safety net for Census Bureau data, specifically those issues and policy questions that may require debate and discussion in the professional community.

The study is NOT dealing with issues related to the 1990 Census. Rather, it is intended to assist the Bureau of the Census to better meet user information needs in its dissemination of data through the GPO depository libraries in the 21st century. The study began in November, 1989, and the final report is to be delivered to the Bureau of the Census by June 30, 1990.

We are especially interested in obtaining comments regarding the following topics:

•What information handling technologies are likely to be most important and useful to the depository libraries in the year 2000 for the distribution of census data to depository libraries and in the dissemination of that data to users?

•What is the likely rate of absorption of new information handling technologies by the Depository Libraries? Will this rate of absorption vary by type or location of library? To what degree will the depository libraries be able to acquire and use the new technologies?

•What possible changes in the structure of the Depository Library Program might occur in the future? What structural changes might be made to improve the effectiveness with which census data is disseminated through the depository libraries? How likely is it that such changes could, in fact, be enacted into law?

•What are the developing trends in the use of Census Bureau data in the DLP? How might usage patterns by specific constituency groups change in the future?

•Who are, and who are likely to be in the future, major census data users? For what purposes are they likely to be using census data?

•How might the depository libraries establish or re-define their relationships with other agencies (e.g., State Data Centers), that might increase access to and use of census data?

•What is the likely future political 'climate' for depository libraries and the likely views of key policymakers toward the Depository Library Program as it enters the 21st century?

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*Volume 14, No. 3 (1990).

We would appreciate receiving comments and views on these topics and questions by May 15. The comments will be analyzed as input for the final report to the Bureau of the Census; they will, however, be presented in summary form and will not be attributed to individuals. Please remember that the context for these topics is the year 2000 and not the 1990 Census.

Your comments or request for additional information should be directed to Charles McClure, School of Information Studies, Syracuse University, Syracuse, NY 13244, (315) 443-2911, BITNET: CMCCLURE at SUVM, or Peter Hernon (508-879-1418)

RECENT RELEASES—

NTIS Products and Services 1990 is the new edition of the catalog from National Technical Information Service. For a copy, call NTIS at (703) 487-4650 and request PR-827.

NTIS now has four major information collections available on CD-ROM: the **NTIS Bibliographic Database** links users with more than 60,000 technical reports and studies; the **AGRICOLA Database** contains bibliographic records for documents from all over the world that are acquired by the National Agricultural Library of the US; the **NIOSHTIC Database** cites some 125,000 records of cases involving hazards and resultant injuries and illnesses in the workplace; and the **Selected Water Resources Abstracts Database** covers 185,000 citations (10,000 added each year) on the characteristics, conservation, control, use, and management of water. Call the phone number above for more information.

The **Statistical Abstract of Oklahoma 1989** is a 700 page reference book containing economic and demographic statistical data about the state as well as comprehensive data for the Southwest and other sections of the US. Contact the Center for Economic and Management Research, University of Oklahoma, 307 W. Brooks Street Room 4, Norman, OK 73019-0450, (405) 325-2931. The price is $22.

A report from the General Accounting Office titled **AGING ISSUES: Related GAO Reports and Activities in Fiscal Year 1989** is a compilation of the GAO's activities regarding older Americans. A broad range of issues are covered, including income security, health care, housing, nutrition, social, community and legal services, employment and age discrimination. The four sections of the 62 page report provide detail on 59 issued reports on policies and programs directed primarily at the elderly, 28 reports in which the elderly were one of several target groups for specific federal policies, 26 testimonies on subjects focusing primarily on older Americas, and 114 studies directly related to older Americans that were ongoing as of September 30, 1989. Contact the GAO at P.O. Box 6015, Gaithersburg, MD 20877, (202) 275-6241 for GAO/HRD-90-56; the first five copies are free.

Prenatal Care in the United States: A State and County Inventory is a two volume publication from the Alan Guttmacher Institute that provides data on the use of clinical prenatal care services by women of various population subgroups and in each of the counties of the US. Included are the incidence of low birth weight, preterm delivery and infant mortality at the county level; the sources and limitations of public funding for prenatal care; and the number of sites in each county were clinical prenatal care is offered. The two volumes are priced at $50; data are also available on floppy disk in Lotus format for $250. Contact the Alan Guttmacher Institute at 111 Fifth Avenue, New York, NY 10003, (212) 254-5656.

The 1989 **Guide to the Data Resources of the Henry A. Murray Research Center** provides information about the nearly 200 data sets acquired by the Center or in the process of acquisition. The Center's holdings can be used for secondary analysis, replication, and longitudinal follow-up in all fields of social and behavioral sciences. The Guide is priced at $12. For $5 you can obtain an 'Index to the Guide' which includes a detailed listing of both the methods of data collection and the content areas in the data sets. Murray Center staff will conduct computer searches for data for $2 each. Contact the Murray Center at Radcliffe College, 10 Garden Center, Cambridge, MA 02138, (617) 495-8140.

SIPP ACCESS Winding Down

The SIPP ACCESS project at the University of Wisconsin-Madison is in its final months and will terminate services to the databases on May 31, 1990. The last months will be spent evaluating the project, archiving the databases, creating an audit trail, providing reference services for the user community, and assisting the Census Bureau in establishing a 'SIPP ACCESS' at the Bureau.

The National Science Foundation has supported the SIPP ACCESS project since 1984 in its efforts to design a prototype for improving access to large-scale, complex data, namely the *Survey of Income and Program Participation*. More than 150 researchers, students, and programmers were taught to use the SIPP data and a relational database management system. The SIPP ACCESS project also experimented with remote access, communications networks, optical archive storage, linkage to the microcomputer, and other new technologies.

Although service to the databases at the Physical Sciences Laboratory on the Wisconsin campus will end on May 31, 1990, the staff at the Institute for Research on Poverty will continue to provide reference services until their grant ends in the fall. The Bureau of the Census is scheduled to open a public utility for the SIPP databases on October 1, 1990.

For more information about SIPP ACCESS at the University of Wisconsin, call (608) 262-6358. For more information on the SIPP databases at the Census Bureau, contact David McMillen at (301) 763-8353.

Appendix D. THE USE OF CENSUS BUREAU DATA IN GPO DEPOSITORY LIBRARIES:

ASSESSMENT OF ISSUES AND TRENDS

Charles R. McClure and Peter Hernon
Principal Investigators

Depository Library Council, April 25, 1990

Funded by the U.S. Bureau of the Census, 21st Century Staff

Please assess each topic/issue as to its relative overall importance for, and impact on improving access to and use of census data through the depository library program in the year 2000. Simply circle the appropriate number that represents your assessment of these topics.

TOPICS/ISSUES	Very Unimportant	Unimportant	Somewhat Important	Very Important
1. The degree to which the Census Bureau produces products which are "user friendly"	1	2	3	4
2. Restructuring the Depository Library Program to take advantage of new technologies	1	2	3	4
3. Coordinating State Data Center services with Depository Library services	1	2	3	4
4. Census Bureau training programs in technology utilization for depository librarians	1	2	3	4
5. Ability of depository libraries to purchase new information handling technologies	1	2	3	4
6. Involvement of the private sector to provide "value added" services and products	1	2	3	4
7. The extent to which the Census Bureau provides, through the Depository Library Program, data in the following formats:	1	2	3	4
a. Paper	1	2	3	4
b. CD-Rom	1	2	3	4
c. Microform	1	2	3	4
d. Electronic Bulletin Boards	1	2	3	4
f. Online Data Bases	1	2	3	4
g. Magnetic Tapes	1	2	3	4
h. Personal Computer Diskettes	1	2	3	4
8. Coordinating Census Bureau depository library services with GPO depository library services	1	2	3	4
9. Depository librarians' skills and competencies to use the new information technologies	1	2	3	4
10. Adequate levels of support for depository libraries in terms of:				
a. staffing	1	2	3	4
b. collections	1	2	3	4
c. information technologies	1	2	3	4
d. training	1	2	3	4
e. other ______________________________	1	2	3	4

	Very Unimportant	Unimportant	Somewhat Important	Very Important
TOPICS/ISSUES				
11. The degree to which the private sector develops "user friendly" software for electronic Census data	1	2	3	4
12. Degree to which librarians will be expected to analyze and/or manipulate data in the various electronic formats rather than providing the overall product itself	1	2	3	4
13. Changes in Title 44 USC regarding the role and responsibilities of depository libraries	1	2	3	4
14. Increasing knowledge and sophistication of users in requesting Census data	1	2	3	4
15. Availability of customized and individualized services and products made directly available to the public by the Census	1	2	3	4
16. Direct user online access to remote databases containing Census data	1	2	3	4
17. Cost-sharing between depository libraries and the Federal government and/or private sector vendors in the provision of Census data	1	2	3	4
18. The inclusion of self-instructional information in Census products	1	2	3	4
19. The degree to which ALL Census products are made available through depository libraries	1	2	3	4
20. The degree to which library user fees are needed to support the provision of Census products to the public	1	2	3	4

21. Of all the issues you ranked as "4" (very important), please assess which are most important and require public debate and resolution:

_____ number of 1st most important issue requiring public debate
_____ number of 2nd most important issue requiring public debate
_____ number of 3rd most important issue requiring public debate
_____ number of 4th most important issue requiring public debate
_____ number of 5th most important issue requiring public debate

Thank you for assessing these topics/issues. Your assessment of these topics/issues will help shape Census Bureau policies for disseminating information through the depository library program.

Please return the questionnaire portion of the handout to the box at the end of the room, to Peter Hernon or Charles R. McClure at any time during the Council meeting, or by mailing your responses to:

Charles R. McClure
School of Information Studies
Syracuse University
Syracuse, NY 13244

APPENDIX E

Future Information Technology and Dissemination Trends: A Literature Search and Analysis*

*This background paper was written by Nancy R. Preston, Syracuse University

The pace of developments in information technology is such that any information-reliant institution that waits and reacts to developments as they occur will be ill-equipped to exploit these advances for the benefit of its constituents. Risks are especially great for public sector and non-profit institutions, such as libraries, because they may not be accustomed to the strategic future planning that the current environment requires. An effort to predict future technological scenarios relevant to library and information science is a necessary early step in enabling these institutions to adopt a strategic stance.

To support a project assessing future issues and trends affecting the dissemination of Bureau of the Census data through depository libraries, a literature search and analysis were undertaken. Although a main purpose of the search and analysis was to identify sound predictions for information technology in the next century, few such predictions were found. Instead, the bulk of the literature studied discussed current trends and likely, near-future developments. The purpose of this paper is to: (1) describe these trends and predicted developments for each relevant type of information technology, (2) discuss these trends and developments as they apply specifically to libraries and access to government information such as Census Bureau data, and (3) identify key issues that must be addressed for successful exploitation of future technologies by libraries for the purpose at hand.

SCOPE OF THE LITERATURE SEARCH

The literature search was performed using the following databases and indexes: American Statistics Index, Business Periodicals Index, CIS/Annual (Congressional Information Service), Congressional Record, Current Index to Journals in Education, Federal Register, Government Reports Announcements and Index, Infotrac, Library Literature, Library and Information Science Abstracts, Monthly Catalog, and Resources in Education. The concept of future prediction was incorporated as much as possible in the search, and, in order to capture current and recent thought, preference was given to articles published after 1984.

TRENDS AND PREDICTED DEVELOPMENTS IN INFORMATION TECHNOLOGY

Computing

Processing Speed and Data Storage. Predicted developments in personal computers, microcomputers, and supercomputers relate, in some way, to all of the technological developments that will be discussed in this paper. Trends that apply specifically to computing include continued miniaturization, increasing speed, falling costs, and a blurring of the distinction between the power and functions of high-end systems and low-end systems.

The drive to pack increased computing power into smaller components continues. Efforts to increase chip speed through integrated circuitry are predicted to result in microprocessors operating at speeds as fast as 30-60 million instructions per seconds

(MIPS) (Peled, 1987). Improvements in speed cannot continue forever because there are physical limits to the amount of circuitry that can be etched on a single chip and the speed at which electronic signals can travel (Peled, 1987; West, 1985).

Alternatives to existing chip technology are already under development. One solution to the problem of processing speed may be chips made of gallium arsenide. These chips can operate at up to ten times the speed of silicon chips, are radiation resistant, use less power, and can withstand a wide range of operating temperatures (Forester, 1987, p.37). Unfortunately, gallium is a scarce metal, and the new chips are far more expensive to manufacture than silicon chips.

The most significant advances in computing speed are expected with parallel processing, a completely new approach to computer architecture that will enable a computer to operate up to thousands of microprocessors simultaneously to solve a single problem. Processing speeds of one million megaflops (a megaflop is one million floating point operations per second), thousands of times faster than today's supercomputers, are predicted (West, 1985). Parallel systems are likely to be most useful for scientific and medical research, defense, and other applications where complex mathematical problems executed on standard supercomputers can take months to solve (Dertouzos, 1986). There are even predictions of future personal computing workstations based on parallel processing. Parallel processing engineering must meet enormous challenges before it is a viable technology, however. It is not known if all mathematical problems can be divided among processors; some believe the number of additional instructions necessary to coordinate the processors may counteract the time saved; and a completely new family of programming languages may have to be invented to operate the hardware (Dertouzos, 1986; Fox and Messina, 1987; Gelernter, 1987).

Capacity of magnetic media for data storage is also continuing to increase. Changes in head design are reducing the distance between the head and the medium and also allowing the use of thinner tracks (Kryder, 1987). With these advances, magnetic storage density could reach 300 million bytes per cubic inch (Peled, 1987). The greatest advances in data storage capacity, however, are expected to come from optical technologies (discussed below).

Expert Systems, Artificial Intelligence, and Fifth Generation Computing. Enthusiastic research continues to be done in the area of expert systems, and practical applications of various degrees of sophistication are now in place and being scrutinized. An expert system aims to build an enormous body of data, based on the knowledge of human experts, then utilize that data in response to user queries according to sets of logical rules which have been developed separately from the database (Davis, 1986; Forester, 1987, p.46). Currently, expert systems are being used in medicine, to recommend treatment protocol for specific situations; in industry, to predict the outcomes of product designs and reduce development time and costs; and in science, to simulate experiments that would be difficult or impossible to carry out in laboratories (Peled, 1987). However, critics point out that human experts possess intuitive capability that can never be replicated by machines. This not only limits computers to becoming, at best, "expert novices in any well- structured and well-understood domain" (Dreyfus and Dreyfus, 1986). It also threatens to create a scenario in which those humans who would become the science, medicine, and business experts of the future perceive the standards set by these systems as final and fail to rise to a true expert level themselves (Dreyfus and Dreyfus, 1986).

The ultimate goal of future computing continues to be artificial intelligence (AI). Despite criticism similar to that given to expert systems and a history of extended deadlines for the realization of AI accomplishments, there are persistant predictions that human lives will someday be transformed by truly intelligent machines. AI development is dependent upon the vastly increased computing power being promised by parallel processing. If AI comes to fruition, it will allow computers to perform such power-intensive functions as communicating in more than one language, understanding and analyzing written information and natural language, reasoning and making decisions in several areas of expertise, producing human-like responses to questions, recognizing objects, and more (Wood, 1988).

Currently under development, the so-called Fifth Generation computers will integrate the most advanced capabilities of information technology--parallel processing, speech and handwriting recognition, expert systems and AI--into single "thinking" and communicating units (Forester, 1987, p. 42; Wood, 1988). Fifth generation developments are expected to impact upon personal, as well as mainframe, computing. The goals of fifth generation computing are far beyond current technology, however, and considered visionary by some. Research and development efforts are hampered by politics and the difficulty in securing financial support for long-term projects in an industry marked by rapid obsolescence (Lewis, 1988).

High powered personal workstations of the future, with sophisticated input/output devices, speech and handwriting recognition, high-resolution monitors with 3-D graphics capabilities, and "transparent" hardware, software, and operating systems are predicted to become available for between $5,000 and $10,000 and have widespread use among scholars, researchers, businesspeople, students, and home users (Crecine, 1986; Peled, 1987). These workstations are also likely to have high quality peripherals such as FAX (telefacsimile) machines, laser printers, and document scanners. The availability of such devices to assist individual computer users in the receipt, input, and output of information is one of the many ways in which the distinction between high-end and low-end computer-based systems is being blurred.

Summary of Trends and Issues Related to Computing

- Computing power is becoming more affordable and blurring the distinction between mainframe and personal computer capabilities;
- Advances in input/output devices and capabilities, such as natural language processing and handwriting recognition, are

contributing to the transparency of computer systems;

- Personal computing workstations incorporate a variety of technologies for managing several different information formats;

- As the physical limits to existing technologies for storage and processing are approached, alternative technologies are being developed; and

- Research in expert systems and artificial intelligence persists despite severe criticism and lack of long-term financial commitment.

Telecommunications and Networks

Fiber Optics and Satellites. Most of the predicted advances in telecommunications rely on the continued development of fiber optic technology. Optical fibers are minute strands of glass that carry data as light pulses rather than electricity. Advantages of optical fiber over conventional copper cable, as used for telecommunications, include speed and capacity several orders of magnitude higher as well as lower error rate and lower cost (Forester, 1987, p. 99; Wintsch, 1989). Fiber optic data transmission speeds are measured in terahertz (one million cycles per second), and the capacity of a single optical fiber is a thousand times what is currently governed by the Federal Communications Commission in each of three places in the visible spectrum (Wintsch, 1989).

Many efforts are underway to install fiber optic networks across countries, between countries, and underwater, especially in the United States, Europe, and Japan. These networks have raised many issues regarding transborder data flow, compatibility among data formats, packet lengths, transmission rates, market regulation, and costs (Dick, 1986; Hargrave, 1987; Mayo, 1987). Networking also has inherent technical problems due to the inability of current electronic systems to receive, translate, and switch optically transmitted data at speeds high enough to avoid "bottlenecking" (Wintsch, 1989).

Satellites continue to be used for data transmission and are expected to complement, rather than compete with, fiber optic networks (Forester, 1987, p. 110). New developments will ease the problem of potentially overcrowded skies. NASA's Advanced Communications Technology Satellite (ACTS), under development, will function as a huge platform that can carry hundreds of transponders, thereby making more efficient use of satellite surface area. Recently, excess bandwidth on FM radio frequencies has become available for data transmission. Information providers use this bandwidth to distribute time-sensitive information, such as financial data and news, instantly to computers equipped with FM subcarrier receivers at points around the world (Melin, 1986).

Digital Telecommunications and ISDN. The Integrated Services Digital Network (ISDN), now under development, is the key to a new generation of telecommunications capabilities. It entails an international effort to convert telephone lines to digital, rather than analog, technology; its completion will eliminate the need for modems and allow rapid transmission of voice, data, and facsimile to or from a single terminal (Forester, 1987, p. 84; Hargrave, 1987; Mayo, 1987). Completion of the ISDN is expected to revolutionize remote computing activity. The projected speed of ISDN transmission is based in part on the application of packet-switching, which speeds the transmission of digital data by sending it in clusters (Dick, 1986). In order for ISDN to fulfill its promise, however, it is absolutely essential that standards be established for compatibility among hardware, software, and telecommunications protocols (Hargrave, 1987).

Standards. A priority for many years, establishing standards for both local and wide area networks is necessary for the efficient flow of data to and from various sources, especially with the development of ISDN. The International Standards Organization's (ISO) Open Systems Interconnection (OSI) architecture for the transfer of data is gaining acceptance by telecommunications carriers and other significant groups (Forester, 1987, p. 121). The benefits of OSI are being extended with the assistance of the Corporation for Open Systems (COS), begun afterwards by a group of vendors to help manufacturers to overcome ambiguity in the OSI standards (Kahn, 1987). Numerous other standards have been introduced in the United States and abroad for applications to both telecommunications and the design of electronic components. Widespread implementation of standards, however, is a challenge which has not yet been met.

Networking and Computer Mediated Communication. The end result of all advances in telecommunications, according to many predictions, will be the establishment of a global information utility. Once the technological capability is in place, scholars, researchers, businesspeople, and others may be able to access specialized databases, use remote supercomputers to operate experimental apparatus, gain access to collections of software, and communicate interactively with colleagues worldwide. Information could be easily manipulated, downloaded, uploaded, and integrated with other information whether it be in text, digital, graphic, or other format (Block, 1984).

While a single global network will not exist for many years, countless local are networks (LANs) have been established within institutions and many wide area networks (WANs) exist in the United States as well. The National Science Foundation's NSFnet effort has attempted to join institutions that are members of other, community-based networks. NSFnet was designed to give users remote access to NSF supercomputers and also to link them with all other participating researchers throughout the nation (Jennings and others, 1986). Within an individual institution, NSFnet members are typically linked through LANs. The congressional Office of Technology Assessment is now supporting the proposed National Research and Education Network, designed to link American universities and researchers with computing resources for all the advantages described

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above (Turner, 1989). Numerous other data-sharing and communications networks exist for special purposes at national, state, and local levels (Jennings and others, 1986). Widespread network access is also expected to empower home office workers in the coming years (Tuck, 1989). Overall, a ten-fold increase in network connections and a six-fold increase in network users has been predicted for the year 2000 (Wintsch, 1989, p. 37).

BITNET, a communications network begun within the academic community, grew extremely fast since its inception in 1981 and served as early proof of a real need for computer mediated communication (CMC). The popularity of CMC, which is primarily for interaction rather than data-sharing, may be due to people's interest in organizing themselves into groups for the creation of collective intelligence (Turoff, 1989). Such systems are predicted to be used increasingly for distance education, computer conferencing, and group decision support systems. Electronic mail is becoming increasingly popular in business and academic settings as a supplement or alternative to telephone and mail communication. Electronic bulletin boards are also growing more common.

Paperless Publishing. Related to visions of a global academic and research network are speculations about a revolution in scholarly publishing. Given the increasingly high cost of traditional journal subscriptions, some are proposing new systems of publishing research results via computer networks (Rogers and Hurt, 1989). Systems might allow for not only transmission of text, but also categorization and indexing, interactive commenting, and bibliometric analysis of citations. The academic community raises many questions related to authority control, review process, possible piracy, etc. It is clear, however, that the technology exists to bypass the constraints of paper publishing and that a switch to new modes of sharing scholarly information could produce many benefits unique to computerized media.

Despite almost uniform optimism for the potential of networking for academic and research purposes, recent episodes involving computer worms and viruses have caused concern that being completely interconnected will compromise the security of both users and data resources. There is also some concern about the wisdom of freely sharing information via computer when questions of intellectual property rights for this medium have not been resolved.

Summary of Trends and Issues Related to Telecommunications and Networking

- Advances in telecommunications are empowering the remote computer user through access to networked information sources;
- The potential of fiber optic data transmission is restricted by the electronic technologies with which it must interface;
- The widespread sharing of data and the interconnection of systems requires the implementation of industry standards;

- The political issues surrounding transborder data flow must be resolved before a worldwide network can be realized;

- The question of regulation versus free market access to telecommunications resources and territories must be resolved; and

- Widespread networking and data sharing require the establishment of security measures and intellectual property controls.

Optical Storage, Information Retrieval, Hypermedia, and Multimedia

CD-ROM. For several years now the optical disk, on which data are recorded and read by lasers, has gained rapid popularity as a storage and access medium. CD-ROM (Compact Disk, Read-Only Memory), the most widely used format, offers vast storage--currently 660 megabytes per five-inch disk, equivalent to about 300,000 pages of typewritten text--for a steadily decreasing price. A CD-ROM disk can now be mastered for about $2,000 and duplicated for $2.00 per copy ("Data Too Cheap to Meter," 1990). CD-ROMs can are highly damage-proof and are small enough to make vast amounts of data portable (Bonner, 1990). Their contents, whether text, audio, or video, can be accessed randomly with the use of appropriate retrieval software. Although their long-term storage capabilities are untested, they are considered to be a likely replacement for many traditional microform applications including archival information storage. Commonly cited disadvantages of CD-ROM may be reduced or eliminated when new developments, such as multiple user access to a single disk, disks that can be written to and erased, and disk "jukeboxes," become practicable.

Many businesses now issue catalogs, manuals, and other large bodies of information for in-house use on CD-ROM rather than microform or paper (Bonner, 1990). Unfortunately, any institution seeking to transfer existing bodies of information to an optical disk system faces large start-up costs for an optical disk drive, high-speed scanner, image display terminal, database subsystem, laser printer, and information retrieval software ("1990: Micrographics Vs. Optical Disk," 1986). Organizations that create or collect their information in digital form are able to cut CD-ROM transfer costs considerably. This is one of many reasons organizations are increasingly likely to create information in electronic form without making a print counterpart.

Many databases intended for widespread use, formerly available in print format and/or on-line, are also being produced on CD-ROM. A growing percentage of these are being developed in full-text versions to satisfy a market for instant and flexible information access. Most agree that CD-ROM becomes a realistic alternative for or supplement to other forms of publishing when the user base is sufficiently large, the data are not rapidly changing, and the information retrieved is not too extensive to read comfortably at a video display terminal (Vaughan and Barnfield, 1988). The volume of information produced on CD-ROM is expected to increase substantially as users become more familiar with the medium and standards are in place so that publishers can enter the market with confidence and institutions can purchase equipment without fear of rapid obsolescence. ISO 9660, CD-ROM data format standards based on the work of the High Sierra Group, promotes the manufacture of interchangeable equipment and has been a positive market factor since its introduction in 1988 (Sanchez, 1989).

Other Optical Disk Formats. Several other optical disk formats exist, though none is yet being used as widely as CD-ROM. Twelve-inch WORM (Write Once Read Many) disks can hold twice as much data as CD-ROMs and allow users to write data to the disk. WORM remains an expensive technology relative to CD-ROM, however; the disks are more costly to produce and the readers are extremely expensive for many potential users. As a result, the use of WORM is limited to large and/or wealthy instutitions (Congress, Office of Technology Assessment, 1988). Another optical format, videodisk, is designed for storing digital images and used primarily for education and training applications. A videodisk holds about 55,000 images at a production cost comparable to that of CD-ROM (Ibid., 1988). Interactive CD-ROM (CD-I) and interactive videodisk are recently emerging technologies that combine text, still and moving images, and audio that can be retrieved randomly by the user. Probable applications include audio-visual talking "books" and interactive education and training materials.

On-line Information Retrieval. The future of on-line information retrieval will be dictated by developments in telecommunications and optical storage technology. Fiber optic networks, which are increasing the speed, volume, cost, and accuracy of on-line transmission, promise to have a positive effect on fee-based on-line services, whereas the availability of optical storage for local and heavily used databases threatens the on-line industry to some extent. The ratio of storage to telecommunications costs will dictate the direction of the information retrieval market (Koenig, 1987). Some predict that the on-line industry will attempt to broaden its market by developing user friendly gateways, perhaps with natural language interfaces; by providing more full-text databases; and by carrying fewer databases with widespread appeal rather than many highly specialized databases (Harris, 1988). There is also interest in developing AI gateways able to receive user queries, interpret them, select and search appropriate on-line data sources, and interpret and package the resulting information for the user.

Hypermedia. A strong trend in information retrieval is in making local applications more sophisticated and powerful. Hypertext or hypermedia computer systems, which integrate data, text, images, and sometimes video and sound, into self-contained information networks that users can follow interactively, may be the key to broadening the audience for information retrieval (McClelland, 1989). Hypertext systems can be designed by their users and added to almost without limit. Once standards are implemented, these personal information retrieval systems may be able to be linked to each other and to larger networks. For large-scale use of hypertext systems for information retrieval purposes, questions of authorship, authority, piracy, vocabulary, and system management would have to be addressed (Larson, 1988).

Multimedia. A step beyond hypermedia is the concept of multimedia, systems that synthesize text, data, graphics, animation, optical storage, image processing, and sound for an entertaining, as well as informative, end product (Chen, 1989; Hawkins, 1989). Multimedia is discussed primarily as a technological development which, when its day arrives, will have true mass market appeal (Saffo, 1989). Multimedia is not a new technology, but an integration of existing (or developing) technologies; as such, it will face challenges of hardware, software, and telecommunications standards. It will also have to survive the collision of several industries: computers, publishing, communications, and entertainment (Saffo, 1989).

Summary of Trends and Issues Related to Optical Storage, Information Retrieval, Hypermedia, and Multimedia

- Information is increasingly being produced in digital format for use in computer-based applications without necessarily having a print counterpart;
- Data producers and data users are cautious in a market without uniformly accepted and implemented standards;
- The ability to store vast amounts of information at low cost has contributed to a trend to produce full-text databases, rather than bibliographic or referral information;
- The ability to store video and audio, as well as textual, data on optical disks and to access that data randomly is leading to new alternatives to books for information and entertainment;
- New computer-based information products rely on the convergence of technologies;
- There is a trend toward user-oriented products and services driven in part by the hope of establishing a mass market for information technology;
- Computers are increasingly being used to interpret and evaluate information rather than simply retrieve it;
- Products and services are being developed to meet end user needs and expectations, and intermediary services may become unnecessary with the development of transparent or intelligent gateways; and
- Standards are needed for full-scale integration of technologies.

TRENDS IN INFORMATION TECHNOLOGY AND FUTURE LIBRARY SCENARIOS

With few exceptions, the literature of library and information science predicts significant changes in the function of libraries as a result of advancing information technology. Trends driving these changes are similar to those that predominate the discussion of information technology generally: the changing of information delivery formats, the integration of systems and technologies, and the empowerment of the remote user. This section discusses these three trends as they apply to future library scenarios and the dissemination of government information, such as census data.

Changing Information Delivery Formats

The greatest change to affect future library services is the growing number of publications becoming available in electronic formats, particularly CD-ROM. Databases, indexes, reference sources, and now full-text products, such as journal collections, are being published in this format. There is an increasing likelihood that libraries will purchase or subscribe to CD-ROM rather than print versions of these materials because (1) users prefer using CD-ROM products for their interactivity, sophisticated search capability, and overall appeal; (2) the cost of some CD-ROM products, relative to print subscriptions, is falling; (3) CD-ROM is durable and frees shelf space; (4) some publications are being produced exclusively on CD-ROM or with added value on CD-ROM. There are also predictions that hypermedia and multimedia publications will become popular as substitutes for books and as an art form in their own right (DeBuse, 1988).

Libraries are also becoming more likely to supply information upon demand, through electronic means, rather than acquire it in anticipation of demand (Whitaker, 1989). CD-ROM and on-line systems that allow users to identify a citation then immediately enter an on-line order for the source document are becoming common. Textbook publishers are experimenting with custom book publishing that allows professors to select particular chapters and contents before printing (Turner, 1989). Bibliographic utilities are now being used for subject searching and on-line ordering as well as cataloging. With the convergence of networked bibliographic and textual information, libraries are likely, in the future, to be able to select what their users need and order on-line or FAX copies from the source for immediate delivery.

Dynamic and/or collaborative authorship, the process of creating documents on-line and inviting interactive commentary or contribution, is another delivery format being enthusiastically predicted. The most optimistic future library scenarios cast the academic library as the center of this activity; works of scholarship or research results might be presented through the electronic library without ever being formally published (Lancaster, 1989; Morris, 1989). And, through network participation, libraries could link their own scholars' creations with those of scholars at other institutions for a worldwide interactive knowledge network.

Finally, there is a growing interest in integrating technology with human processes to serve library users. In particular, expert systems may be used as one-stop gateways to all of the bibliographic data and on-line information sources available through the library (Molholt, 1988; Morris, 1989). These would ideally have natural language capabilities, allowing users to retrieve information according to their own thought patterns. Already, many libraries successfully use user-friendly hypermedia systems to provide routine information to library users and as gateways to their on-line public access catalogs.

The popularity of electronic formats also applies to government-produced information. The Bureau of the Census is currently considering the feasibility of CD-ROM as a primary vehicle for distributing data to depository libraries (Sanchez, 1989). By capturing data electronically and transferring it directly to CD-ROM or to on-line format, agencies like the Census Bureau could realize significant savings over paper production costs (Congress, Office of Technology Assessment, 1988, 1989).

Probably the most significant advantage for depository libraries would be the provision of great numbers of census datasets, until now available only on magnetic tape, in an accessible format (Sanchez, 1989; Tonn, Edwards, Goeltz, and Hake, 1990). Currently, the Census Bureau plans to produce most of its CD-ROM products at Level 1, i.e. data without text, headings, or other features added to aid retrieval and interpretation. It is likely that commercial vendors will produce user-friendly retrieval software to work with the CD-ROMs or repackage the datasets with added value. In any case, Census Bureau plans to produce thousands of datasets on CD-ROM would effectively make census data accessible to the general public, not just researchers with access to mainframe computers and the skill to download and interpret complex datasets (Tonn et al., 1990).

The decision to distribute a substantial amount of government information on CD-ROM, whether to replace or to supplement paper copy, would have to take several variables into account (Sanchez, 1989):

- Comparative costs;
- User acceptance;
- Product durability;
- The availability of retrieval sofware that is easily used by novices;
- The expected volume of use;
- The importance of random and interactive access; and
- The burden placed on depository libraries to provide equipment, workstations, and training.

It would also have to consider government agencies' mandate to provide public access to data and whether those principles might be violated with a medium less readily accessible than paper copy (Congress, Office of Technology Assessment, 1989). Despite some apparent drawbacks, however, many government agencies are already committed to CD-ROM, and a significant number of regional and selective depository libraries want to receive statistical data in this format and/or on-line (General Accounting Office, 1988).

Integration of Systems and Technologies

Much of the literature warns that the successful library of the future will not simply adopt new technologies as they become available, but will rethink its function and services as a prerequisite to fully integrating new technology for the benefit of its constituents (Battin, 1984; Wall, 1989). Integration will occur to some degree among different systems and technologies and within the body of library sevices as a whole. One common suggestion is to expand the scope of the on-line public access catalog to serve as a central source for data files that have been received from Federal, state, and local governments; networks; commercial publishers; associations; and other libraries (Wall, 1989). This would necessitate the restructuring of current systems of cataloging and categorization to acccommodate not only textual information, but also numeric and graphic data, hypermedia products, and, possibly, locally produced interactive knowledge bases (Molholt, 1986; Morris, 1989).

Integration of technologies may also mean providing new equipment and services as necessary to fulfill user objectives more efficiently. The shift to providing information upon demand will result in FAX, electronic mail, networks, and other on-line sources being used for interlibrary loan requests and instant document delivery from remote sources. Personal computers may be provided in the library for users to download and manipulate electronically held information and access remote data stores as well as to take notes (Hall, 1990).

Integrated technologies are also expected to have a significant impact upon the production and distribution of government information and data. The ability to combine input, storage, processing, and output technologies for a range of data and media types will likely lead to significant performance improvements for information-based agencies (Congress, Office of Technology Assessment, 1988). In the future, expert system interfaces might be applied to census information to facilitate the downloading and interpretation of complex on-line data (Sanchez, 1989). Another possibility is the integration of information from different agencies or projects to simplify or enhance research. A significant number of depository libraries that were surveyed to determine their interest in obtaining government information in electronic formats, would like a single on-line or CD-ROM database providing access to key data files produced by a variety of government agencies (General Accounting Office, 1988, p. 56).

The Bureau of the Census is now employing the Topologically Integrated Geographic Encoding and Referencing System (TIGER). Developed with the Geological Survey, TIGER is a geographic information system featuring a digital map database that can be integrated with census data. The system allows researchers to apply a spatial component to the analysis of statistical data. Several derivative products are planned, including TIGER/Line, collections of census data maps for individual counties produced on both magnetic tape and CD-ROM (Carbaugh and Marx, 1990).

Also significant are the Census Bureau's various methods of capturing data electronically. Although these methods, some of which are still under development, do not impact directly upon users of census data, they do facilitate the development of automated retrieval systems. One such method is the Computer Assisted Telephone Interview System (CATI), which standardizes the census interview process, allows automated coding and on-line editing of responses, and makes data available for both immediate and longitudinal analysis (Tonn et al., 1990). Another program is the FOSDIC data capture process, which rapidly identifies and records the responses made on paper census forms. Technology is also being developed to scan census forms and record them on laser disks for both archival and analysis purposes (Ibid., 1990). The use of both local and wide area networks throughout the Census Bureau facilitates the flow of electronically captured data among divisions.

Empowerment of the Remote User

A uniformly supported goal of the future library is the ability to provide services to remote users. Assuming most scholars and many home information users will have high powered workstations capable of receiving textual, numerical, graphic, video, and audio information, the library must prepare itself to provide remote access to these types of data, whether they are housed in the institution or available through on-line networks (Molholt, 1986). Scholars will expect to be able to build personalized information files from electronic sources through the academic library. Access may be provided, perhaps through intelligent gateways, to all types of information from a huge body of on-line and networked sources, including bibliographic utilties. Some warn that if the academic library does not provide this capability, scholars are likely to bypass the library in favor of commercial telecommunications and information services (Morris, 1989).

There is an increasing interest in integrating the academic library with campus computing services for the seamless provision of information and processing capabilities (Battin, 1984; Rochell, 1987). This goal is being achieved at the University of California, Los Angeles business school, for example, where a new library facility is being housed with computing facilities and directors of both facilities are planning coordinated information services to avoid an "artificial separation of information" (Hall, 1990). Placing the library at the center of a computer-based information network would enable the library to become the true knowledge center described above, contributed to by local scholars and researchers through electronic and interactive publishing. This would require a high degree of cooperation among scholars and researchers, likely to be achieved only with the resolution of copyright and intellectual property issues (Battin, 1984; Rochell, 1987).

The potential to make government information available to remote users is similar to that for other information. The implementation of FTS 2000, the government's state-of-the-art communications network, may facilitate the transmission of textual, numeric, and graphic data to libraries and remote users (Congress, Office of Technology Assessment, 1988). There is some speculation that future Census Bureau data will be centralized and sent to remote users upon request (Rowland, 1989). In this scenario the role of intermediaries, such as State Data Centers and libraries, is uncertain. While the growing computing capabilities of remote users may make intermediary services unnecessary, there may be a need for information brokers to help users navigate an overwhelming supply of on-line data (Ibid., 1989).

Whether census data is made available through a single source or continued to be distributed through the depository library program, libraries may choose to link such data with non-government information sources in a single, remotely accessible integrated information network. To integrate census data with existing databases, however, systems would have to be developed that would not only enable typical users to retrieve the census data but also allow the data files to interface well with the gateway linking all the information sources carried on the same integrated system.

ISSUES THAT MUST BE ADDRESSED BY LIBRARIES

It is beyond the scope of this paper to present a full discussion of the impact of advancing information technology on libraries, the culture of librarianship, and policies for the dissemination of government information. It is possible, however, to identify major issues that must be examined or resolved in order for the library to reap the benefits of information technology for a national body of information users.

Public Access to Information

A major concern for both public and academic libraries is their ability to ensure equitable access to information. This mandate appears to be challenged by the increasing provision of information in electronic formats; whereas print information can be directly accessed by most library users, electronic information requires equipment and training. It appears that the same technology that makes vast quantities of information available in new formats also threatens to restrict access to that information (Morris, 1989). Although government agencies, including the Bureau of the Census, will distribute more "publications" to depository libraries on CD-ROM, no arrangement has been made to assist depository libraries in acquiring the resources to supply training and install expensive equipment for users (Rowland, 1989).

There is also concern that the private sector will assume a role in the delivery of government information, such as census data, and charge prohibitive prices. Retrieval software for CD-ROM databases, for example, may be developed commercially rather than provided by the government. Although commercial firms are more experienced in retrieval software and more likely to produce a high quality search system, they are certain to charge relatively high prices (Rowland, 1989). Commercial firms may also use public domain information and package it in expensive value-added systems that are more attractive and useful than government produced systems. Some believe that unless government agencies are required to go beyond the supply of information and ensure affordable access to it, the advantages of electronic information formats may be denied to a significant body of users.

The issue of access in this context is similar to the longstanding debate over whether it is acceptable to charge fees for on-line library services. In both cases, it is assumed that the new service formats are more expensive to provide than traditional services because they have obvious new costs attached to them. In fact, libraries typically have not calculated the cost, per transaction, of providing traditional services, such as reference book and journal subscriptions and personal reference assistance. If this information were available, librarians might find that providing CD-ROM and on-line information on demand is more cost-effective than maintaining a large reference collection. (Unlike traditional services, electronic services generate data that can easily be monitored to study the utility of these services.) Furthermore, fully integrating electronic information into the library collection and using telecommunications to send that information to remote users may actually increase overall information access.

Libraries' Relationship to Publishers, Authors, and the Academic Community

A second major issue to be addressed by the library community is its relationship to producers and users of information in an age where electronic information delivery will replace traditional publishing to a great extent. Libraries will no longer act primarily as vast storehouses of print information but, rather, will function as flexible and decentralized service centers for a body of information users that is increasingly reliant on information in electronic formats. The transition from the information acquiring role to the information channeling role, however, is complicated by the rapidly changing system by which information is produced.

The library's ability to assume its new role is threatened by:

- The changing economics of publishing as commercial paper copy with one-time purchase price gives way to on-line and CD-ROM products with subscription or per-use pricing;
- Commercial vendors' control over the quality of the software interfaces developed for use with on-line and CD-ROM systems;
- Commercial vendors' control over the pricing of databases and interfaces;

- The possible inability of telecommunications developers and product developers to accept and successfully implement universal technical standards;
- The possible inability of the legal system to establish policy on intellectual property that anticipates the special features of new publishing technologies;
- The possible lack of cooperation among scholars who are potential contributors to interactive knowledge bases and other (non-commercial) networked information sharing systems; and
- The unpredictable reaction of journal publishers to electronic scholarly publishing networks.

Rather than wait to cope with the eventual outcomes of these and other conflicts, the library should attempt to influence the information production industry and information dissemination policy for its own benefit. By taking a leading role in an unstable environment, the library might be able to establish itself as a key component of the future technological society. In addition, by steering developments for the benefit of a national body of information users, the library could ideally elevate the needs of these users over commercial and political interests. On the contrary, if the library fails to influence changes in the production and supply of information, it risks becoming displaced by the commercial sector.

Facing a New Role and Embracing Change

The greatest challenge to the library community in the face of advancing information technology is to establish a unified vision of its role. Not all public and academic libraries will find it appropriate or possible to engage in the changes described throughout this paper. However, information technology will affect all libraries to some degree, and those that do not embrace and direct technology for the benefit of their constituents will play a diminished role in society. Indeed, the predominant theme in library literature is the fear that libraries will lose an important opportunity for society and for the profession if they do not adopt a proactive stance toward information technology.

A first step for librarians is to develop an open attitude toward technology generally. Many librarians' understanding of technology has been limited to library automation. There has been much controversy over the value of systems available to libraries, and many remain skeptical about the benefits of using machines to perform tasks that were done well by people. However, when technology is indicated for purposes beyond performing existing tasks, i.e., when fundamental changes in library functions are called for and technology is needed to support them, librarians will not have the option of dismissing technology. Unless librarians are willing to consider the possibility that technology can fundamentally change the way knowledge is created and shared, they will be unable to participate in the more optimistic developments being predicted for the field and will be limited to implementing only superficial technological change. (For a fuller discussion of librarians' resistance to technology see Fine (1979).)

Librarians must also learn to rethink their individual roles in the provision of information as libraries shift their emphasis from place and procedure to services provided (Crismond, 1986). Future librarians will act as brokers for local and remote users of networked information sources. Some point out that librarians have functioned as information brokers all along (Cart, 1987). Regardless, the librarian of the future will need a new body of information management skills and technical capabilities. In addition, the library as an organization will have to restructure itself as the traditional distinctions between technical and public services, and between acquisitions and circulation, will be senseless to maintain (Cannon, 1985; Hoadley, 1986; Lynch, 1987).

CONCLUSION

By embracing the change that is dictated by improvements in information technology, and by assuming a leadership role in an information-based society, the library has the opportunity to channel an enormous flow of information, from government, academic, and comercial sources, for the benefit of an extended body of users. Specifically, the library must:

- Engage in research to develop estimates of the amount and types of information likely to become available, or exclusively available, in electronic formats;
- Study the ability of library users, both on- and off-site, to effectively use automated information systems;
- Study trends in usage of existing on-line systems and attempt to predict future levels of usage of electronic information accessible through the library;
- Engage in long-term strategic planning to guide development of its new role in society;
- Redesign its budgeting practices to accommodate the shift from an acquisitions-based to a service-based institution and to pay for required equipment and support;
- Provide for widespread and ongoing user training for all information sources and formats;
- Make long-term facilities plans to prepare for automating library services; plan to adapt or build new facilities as necessary to prepare for both receiving and making available growing amounts of electronic information in various formats;

- Plan for or begin retrospective conversion of existing information records to facilitate future automation and integration of systems;

- Begin training or retraining programs for staff to gain necessary skills in automated systems and information retrieval, to aid their development as information access experts; and

- Become politically active as necessary to establish leadership in the information technology movement and to secure the necessary financial support for the shift to a technology-based institution with a growing body of users.

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